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# User Manual



## Matrix Switcher

### 16x16

## **Before You Begin**

- Follow all instructions marked on the device during using.
- Do not attempt to maintain the device by yourself, any faults, please contact your vendor.
- Provide proper ventilation and air circulation and do not use near water.
- It is better to keep it in a dry environment.
- The system should be installed indoor only. Install either on a sturdy rack or desk in a well-ventilated place.
- Only use the power cord supported with the device.
- Do not use liquid or aerosol cleaners to clean the device.
- Always unplug the power to the device before cleaning.
- Unplug the power cord during lightning or after a prolonged period of non-use to avoid damage to the equipment.

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# 1. Matrix System Overview

## 1.1 Introduction












Matrix Switcher is high performance HDMI switching equipment combining with video and audio. It is used for input/output cross switching of multimedia signals. Through 16 sets separated HDMI sources, you can also transmit multimedia input separately to each multi-output equipment, thereby minimizing signal attenuation and ensuring high definition, integrating high fidelity graphics and audio signal output. Besides Matrix Switcher can through the extended accessory devices to over long distances for transmitting data or detecting signal.

Matrix Switcher is used mainly in TV broadcasting projects, multimedia conference halls, and large display performances, TV teaching and command control centers. It boasts features of power interruption protection during power surge, LCD display and synchronous and integrate audio/visual switching functions. Supports 16 HDMI Type A for input and output connectors. Beside it also supports a RS-232 or LAN communication port enables convenient communication with remote control equipment to switch the multimedia signals.






Figure 1-1 Matrix Switcher

## 1.2 Packing

	HDMI Matrix Switcher
	RS-232 Communication Connected Cable
	Power Cord
	IR Receiver Cable
	IR Blaster Cable
	LAN Line
	Female 1x5 Pole Captive Screw Socket * 2
	Matrix Switcher Remote Controller
	AAA Battery * 2
	AV Matrix Software CD
	User Manual

## 1.3 Accessories (Optional)

	IR Mini-Controller
	IR Receiver Cable
	IR Blaster Cable

## 2. Features

- Support up to 16 HDMI input/output interfaces
- Mixed use HDMI cables for input and output connection
- HDCP Compliant
- EDID management (Copy from OUT port 1)
- Centralized control upon 32 series connections via RS-485
- Memory control can up to 8 sets
- Support computer video up to 1920x1200
- Support HDTV up to 1080p@60Hz, 12-bit
- Support original 3D pass through
- Support High Definition Audio (Dolby TrueHD, Dolby Digital Plus and DTS-HD MA)
- IR pass-through supports all IN and OUT ports
- IR pass-through supports all kinds of IR frequency band
- IR pass-through supports duplex transmission between IN and OUT ports
- IR pass-through switch is based on HDMI switched by controller
- Support IR remote control
- Support IR Mini-Controller to select the input channel through Output configuration
- Support RS-232 control
- Support RS-485 serial control
- Support Ethernet control
- Internal universal power supply
- 3U rack

### 3. Specifications

Hardware	
Input Connector	16 x HDMI Type A
Output Connector	16 x HDMI Type A
RS-232 Connector	DB9 Female
LAN Connector	RJ-45
RS-485 Connector	2
2 pins Dip Switcher	1
8 pins Dip Switcher	1
LCD Module	1
Power	100VAC~240VAC, 50/60Hz, internal
Housing	Black Aluminum
Mounting	Rack mountable (3U-rack-mount kits)
Weight	7.5kg
Dimensions (LxWxH)	336x482x130mm (3U high, full rack wide without grips)
Multimedia	
Max. Resolution	1080P@60Hz, 12-bit
Highest TMDS Frequency	225MHz
Control Information	
HDMI Cable Distance	At least 10 meter
Baud Rate	9600 bps; 8 data bits, 1 stop bit, no parity
Ethernet Protocol	HTTP, DHCP, TCP/IP, ICMP (ping)
Program Control	Web Server, AVM Application
Serial Control Port	RS-232: 9Pin Female D Type Connector RS-485: 1X5 Pole Captive Screw
Control Sequence	Matrix
Remote Control	Remote Controller, IR Receiver, IR Blaster
Web Server	LAN, RJ-45

## 4. Device Installation

The Matrix Switcher has a black metallic housing. It can be placed on a sturdy desk directly or installed on a 19-in bracket. See Figure 4-1 below:



Figure 4-1 Mount the Device on a Standard Bracket with 3U Rack-mount

## 5. Front/Rear Panels

### 5.1 Front Panel



Figure 5-1 Front Panel

Matrix supports up to 16 Output/Input switching keys on the Front Panel allowing you to switch signal quickly. Also refer to [8.Operation Example](#) about below descriptions.

- **OUT1~16 keys** (output channel): Specify the Channel 1~Channel 16 for HDMI signal output. These keys configure the status or access the settings; you can also use these keys to switch output channels.
- **IN1~16 keys** (input channel): Specify the Channel 1~Channel 16 for HDMI signal input. Use these keys to switch the connected input channels or use them to instead of number keys upon memory selections.
- **ALL:** This key allows user to set single input channel to all output channels. The usage of “ALL” key is the same as output key.
  - Press the “ALL” key.
  - Select the one of the IN 1~16 keys.
  - The selected **IN x** key will transfer the input signal to all output channels.
  - You can also press the “ALL” key and then press the “OFF” key to disable all the displayed switching settings.
- **OFF:** Disable the entire output channels. Press one of the **OUT x** keys that want to be disabled for the output channel, then press the “OFF” key. Likewise, press the “ALL” key and then press the “OFF” key to disable all the displayed switching settings. In addition to switching port menu, press “OFF” key can return to the main screen during implementing in other menu. You can also press “OFF” key to disable the light of LCD screen for saving power.

- **EDID: FIX** (fix mode) and **OUT1** (access the first output channel) selection key.
    - **FIX mode:** The Matrix Switcher supplies a set of fixed **EDID** values to support up to only 1080P high performance TV.
    - **OUT1 mode:** The Matrix Switcher will access the **EDID** values of high performance TV that connected to the first output channel, and copy the **EDID** value to all the input channels so that the DVD player can support to all the HDTV.
  - **RETURN:** Press this key to go back to main screen.
  - **PLUG:** Press this key to show you the status of all HDMI Type A jacks on the rear panel. If the HDMI jack is in HPD (hot plug detect), it will appear “O” on the screen. Alternatively, it will appear “X” specified the HDMI jack is unused.
  - **INFO:** Press this key to show you the Matrix Switcher’s version, ID and IP address.
- ☞ Press **PLUG** and **INFO** keys simultaneously to show you the firmware versions of modules.
- **STO:** The “**Store Key**” saves all current output/input corresponding relations up to 8 sets for a memory control.
    - Press the “**STO**” key firstly.
    - Arrange memory location. (Support up to 8 sets of memories, user can select the memory location through OUT1~OUT8/IN1~IN8.)
    - The relations among all settings will be saved in the memory permanently.
  - **RCL:** The “**Retriever Key**” retrieves all settings that are saved in the memory.
    - Press the “**RCL**” key firstly.
    - Then make a random to select one of output/input channel key 1~8.
    - The system will retrieve the saved all status and implement current status switching if the previously saving channel is selected.
- ☞ Press and hold **STO** and **RCL** keys simultaneously at least 1 sec. to restore to factory default values.
- **ACTIVE LED:** A clear LED indicator designed for reaction by pressing keys on the front panel and remote controller. Refer to [Appendix A Matrix Switcher Remote Controller](#).
  - **IR Receiver:** Infrared receiver can receive signals from the Matrix Switcher Remote Controller.
  - **LCD:** LCD display shows current Matrix Switcher status and operation status.
- ☞ Press any keys on the front panel or controller to enable the light of LCD momentarily. This function cannot be controlled by RS-232 or LAN.

## 5.2 Rear Panel



Figure 5-2 Rear Panel

The HX-331616 supports up to 16 input / output jacks (HDMI Type A), on the rear panel, each female terminals form the signal input / output jacks. The Matrix signal input / output terminal channels are numbered as IN1~16 / OUT1~16 channels. The input terminal channels supply you to connect to different equipment including Blu-ray/DVD players, graphics workstations, and number displays. The output terminals can be connected to HDTVs, projectors, video recorders, displays and multiplexers and so on.

- **Power Port:** The Power Port is applicable for 100~240VAC, 50~60Hz connected to the outlet of power source.
- **Power Switch:** To switch power ON or OFF the Matrix Switcher.
- **RS-232:** Use a 9-pin **RS-232** cable to connect both computer serial port (COM1 or COM2) and Matrix Switcher **RS-232** communication port, refer to [6.6.1 RS-232](#). The computer then can be deployed to control the Matrix Switcher after installing of application software. Refer to [7.1 Software Introduction](#) for a software control or [Appendix D RS-232 Communication Protocol](#) for an individual configuration.
- **RS-485:** Connection ports allow you to connect/control more than one Matrix product, refer to [6.6.2 RS-485](#).
- **LAN Port:** Use the RJ45 connection cable to connect the Internet and the Matrix Switcher. The entire PCs at the same network can control the Matrix Switcher through the LAN port. Refer to [6.6.3 LAN Port](#).
- **Switchers:** supports 8 pins DIP switcher and 2 pins DIP switcher for connected configurations. For more information, refer to [6.6 Ports and Switchers](#).
  - Pin 1~Pin5: ID
  - Pin 6: Master/Slave
  - Pin 7: RS-232/LAN
  - Pin 8: IP RESET



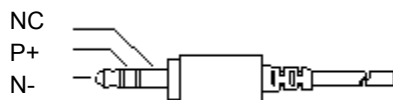
- **IR EXT:** This is used to connect the IR Receiver Cable for the Matrix Switcher Remote Controller.
- **INPUT1~16:** Matrix Switcher Input jacks are connected to the Blu-ray players, DVD players, STBs or other source devices.
- **OUTPUT1~16:** Matrix Switcher Output jacks are connected to the HDTVs, projectors or other sink devices.

#### HDMI Type A Connector pin definition:

Pin #	Signal	Pin #	Signal
1	TMDS Data2+	11	TMDS Clock Shield
2	TMDS Data2 Shield	12	TMDS Clock-
3	TMDS Data2-	13	CEC (NC on device)
4	TMDS Data1+	14	Utility (NC on device)
5	TMDS Data1 Shield	15	DDC-SCL
6	TMDS Data1-	16	DDC-SDA
7	TMDS Data0+	17	DDC-Ground
8	TMDS Data0 Shield	18	+5V Power
9	TMDS Data0-	19	Hot Plug Detect
10	TMDS Clock+		

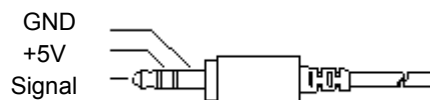
- **IR Tx1~16 Ports:** Used to connect to the IR Blaster Cable for IR pass-through.

#### IR Blaster Pin Definitions:



- **IR Rx1~16 Ports:** Used to connect to the IR Receiver Cable for IR pass-through.

#### IR Receiver Pin Definitions:



## 6. Matrix Device and Peripherals Connection

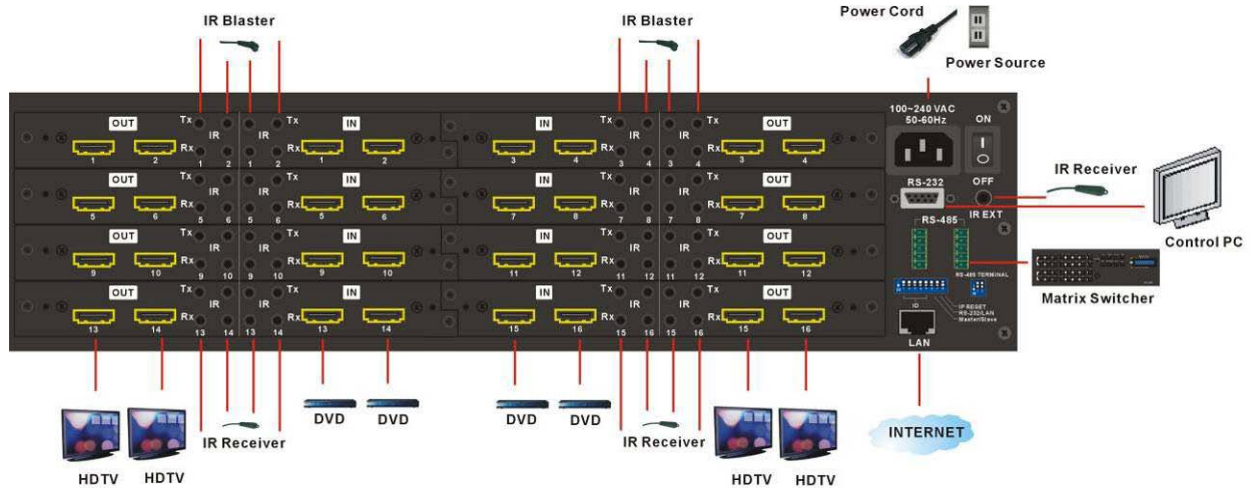


Figure 6-1 Connections

The Matrix supports up to 8 I/O modules for reparation or upgrade. Each module can be configured individually based on module number. You can search these module numbers by pressing **PLUG** and **INFO** keys simultaneously when you want to upgrade firmware version.

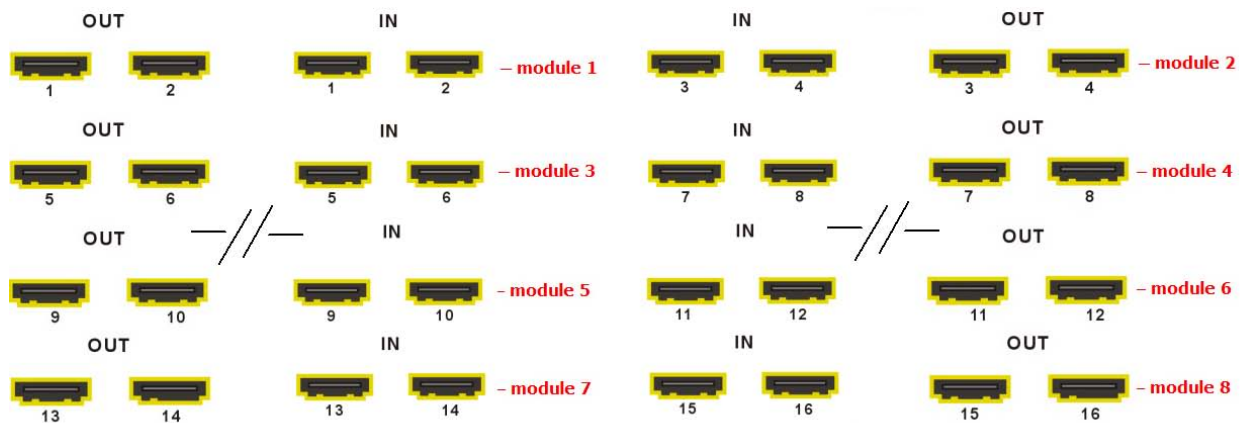


Figure 6-2 Modules Deployment

## 6.1 Input/Output Connections

Use the HDMI connecting cable to connect the Input serial jack (No.1 ~ No.16) to the HDMI jack of the Blu-ray /DVD player/graphics workstations/number displays and output serial jack (No.1 ~ No.16) to the HDMI jack of HDTVs, projectors, video recorders, displays and multiplexers so on.

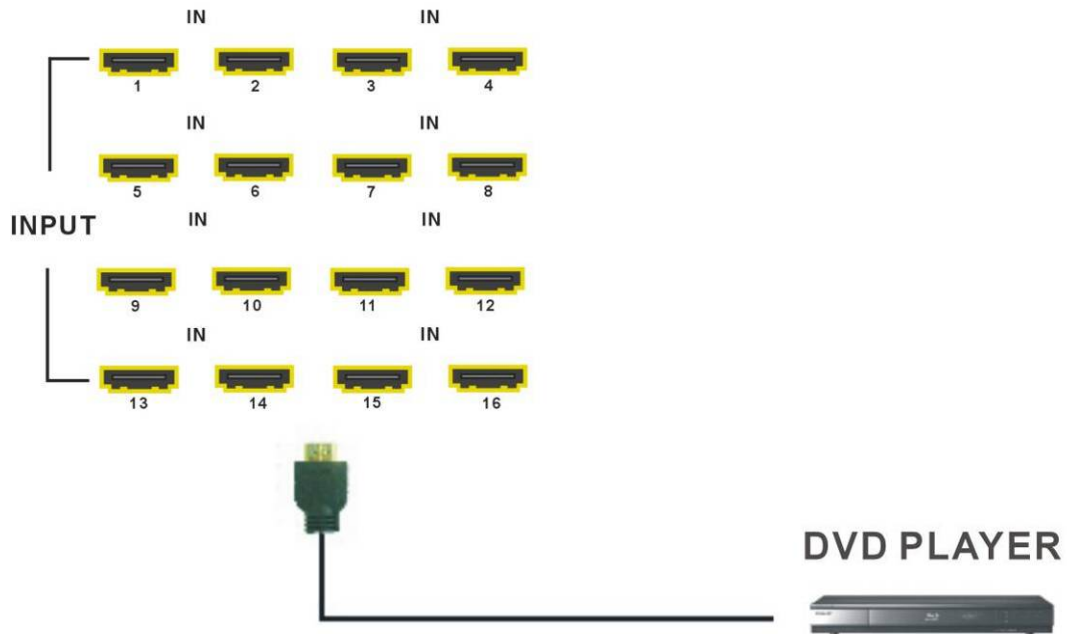


Figure 6-3 Input Connections

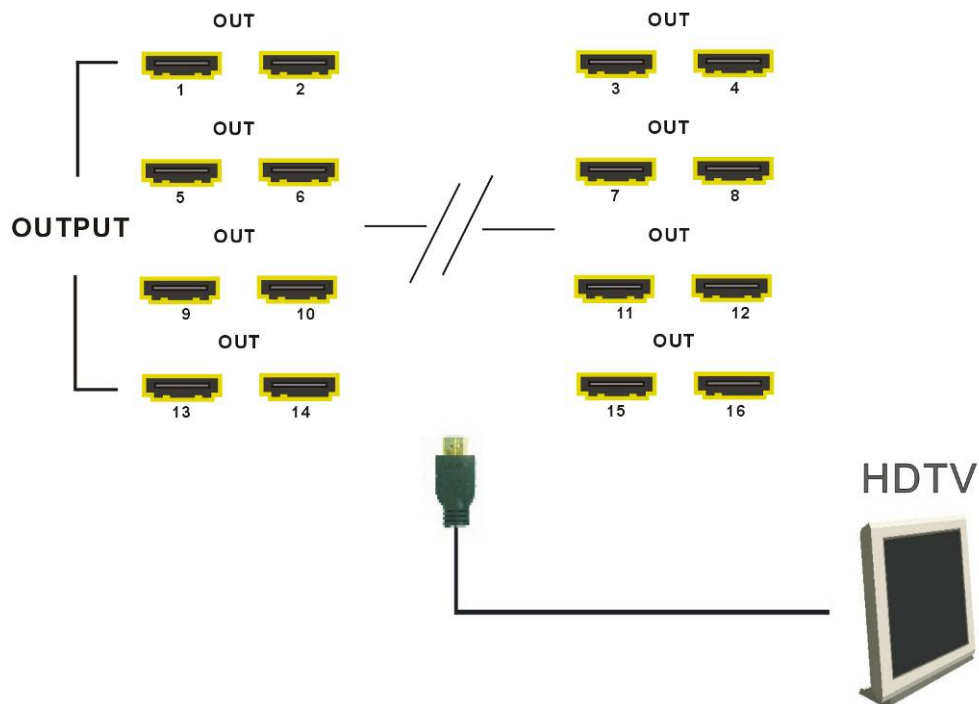


Figure 6-4 Output Connections

## 6.2 IR Pass-through Connection

The Matrix Switcher provides an IR Receiver Cable and IR Blaster Cable accessories for IR pass-through. IR Receiver Cable can be connected to IR Rx ports or IR EXT on the rear panel. On the other hand, IR Blaster Cable can be connected to IR Tx ports on the rear panel.

- Support you an IR channel to control the player from TV or control the TV from player.
- Support all kinds of IR frequency band
- IR pass-through switch is based on HDMI switched

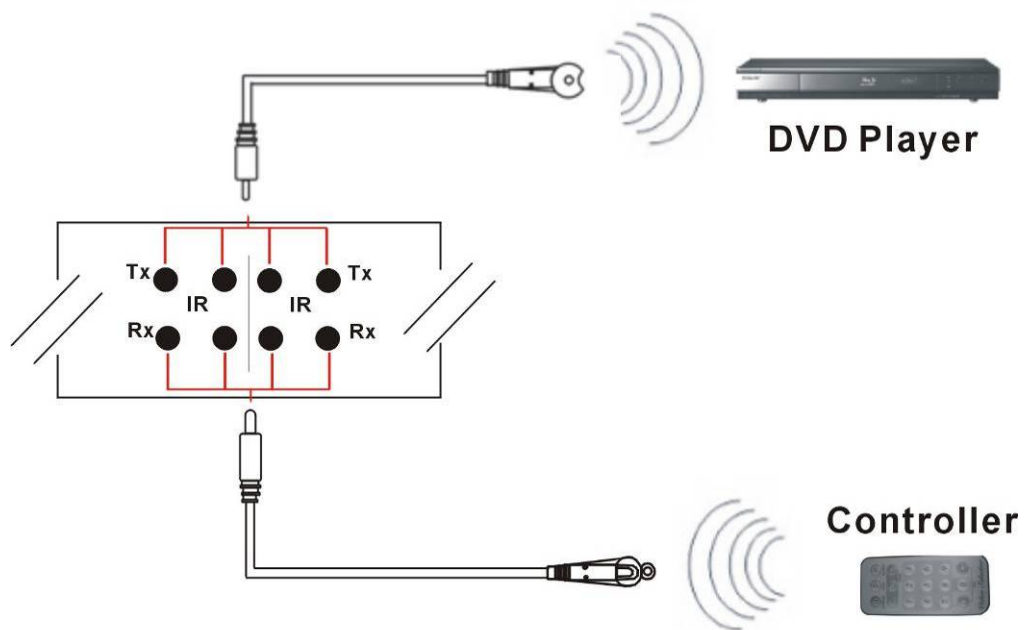


Figure 6-5 IR Extended Aiming - Multimedia

## 6.3 IR EXT Connection

The Matrix Switcher provides an IR Receiver Cable for more convenient to react to the Matrix Switcher Remote Controller. If it is difficult for you to aim at IR Receiver on the front panel due to the location of Matrix Switcher, please connect IR Receiver Cable to the IR EXT port located on the rear panel for optional position.

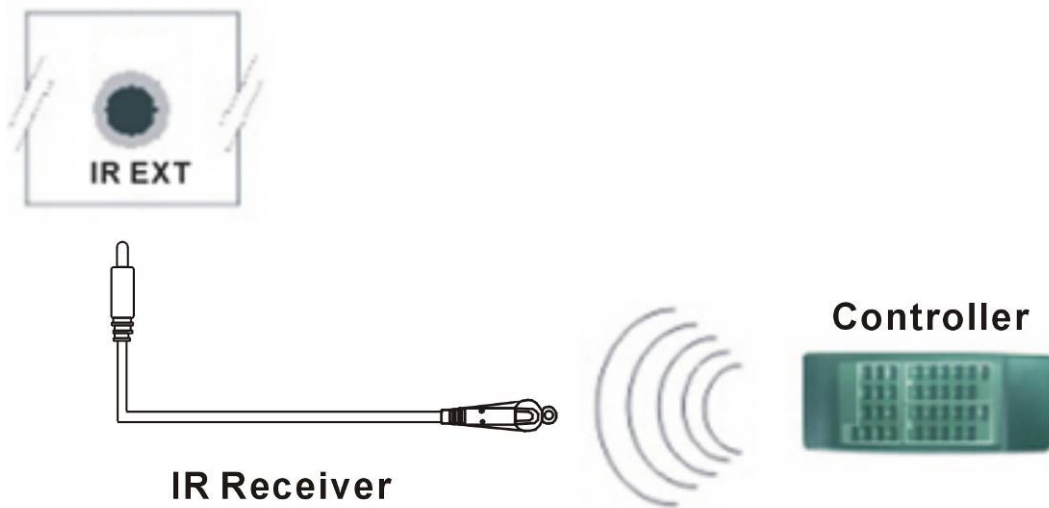


Figure 6-6 IR EXT Connection

## 6.4 Power Connection

Use the included power cord to connect from the power port on the rear panel of HDMI Matrix Switcher to the outlet.

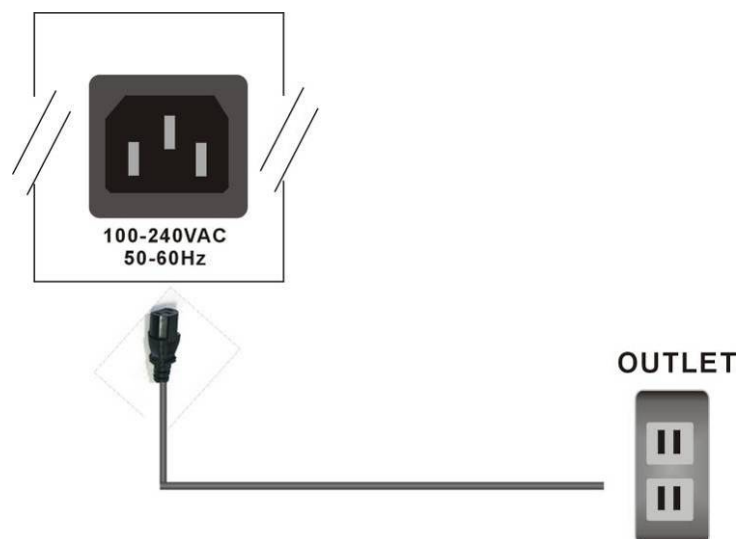


Figure 6-7 Power Connection

## 6.5 Matrix Switcher Remote Control

Use the RS-232 connecting cable to connect the computer serial communication port (COM1 or COM2) to the RS-232 communication port of the Matrix Switcher. The computer can then be used to control the Matrix Switcher after installing of application software. Aside from using the front panel keys for switching operation, you are also permitted to use the RS-232 connection port for remote operation.

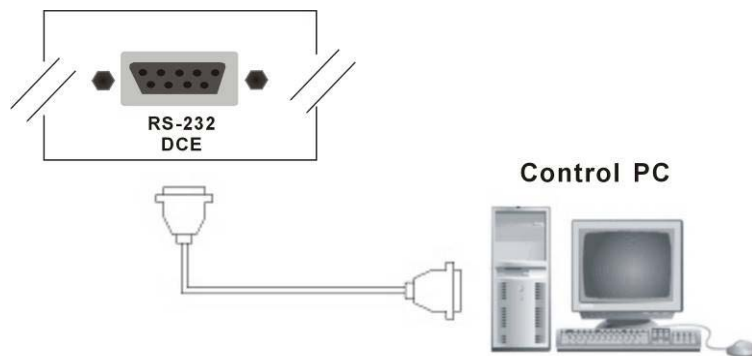


Figure 6-8 RS-232 and Control PC connection

The Matrix also supports a LAN port allows you to control all the series connection devices through PC Browser.

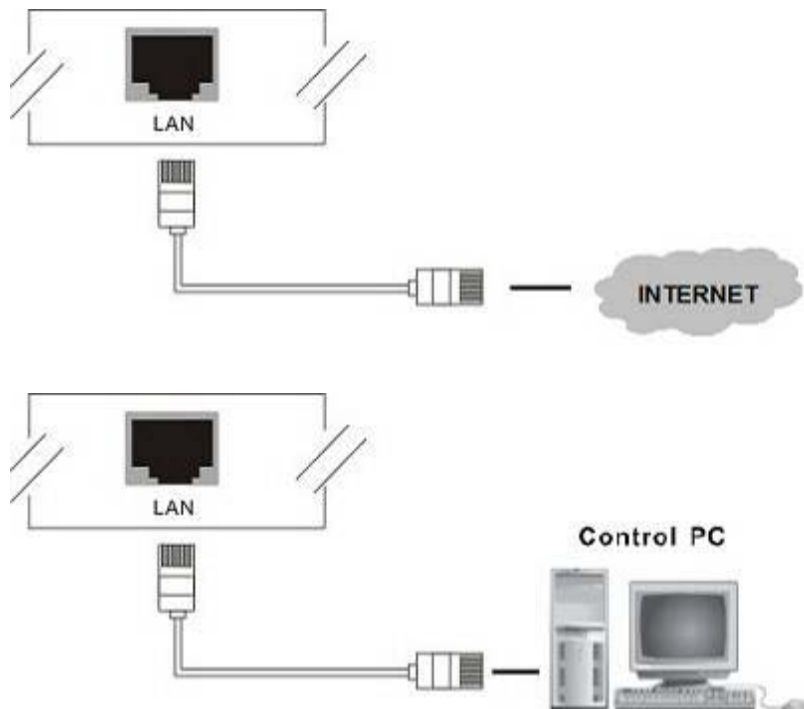


Figure 6-9 LAN port and Control PC Connection

☞ The Matrix supports RS-232 and RS-485 on the rear panel for a remote control and allows you to operate settings via the keys located on the front panel.

## 6.6 Ports and Switchers

The Matrix Switcher provides standard RS-232 and RS-485 serial communication ports. Beside the front panel for key switching operation, you can also use the RS-232 or RS-485 serial communication port to carry out remote operation.

### 6.6.1 RS-232

The RS-232 Pin functions are described as below:

Pin No.	Abbreviation	Description
1	N/u	Null
2	TXD	Send
3	RXD	Receive
4	N/u	Null
5	GND	Ground
6	N/u	Null
7	N/u	Null
8	N/u	Null
9	N/u	Null

☞ The Matrix Switcher RS-232 port is defined by DCE.

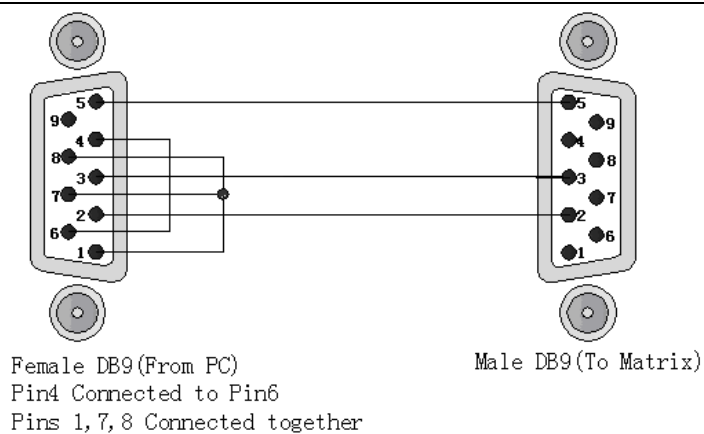


Figure 6-10 (a) RS-232 – From Female DB9 (PC) to Male DB9 (Matrix)

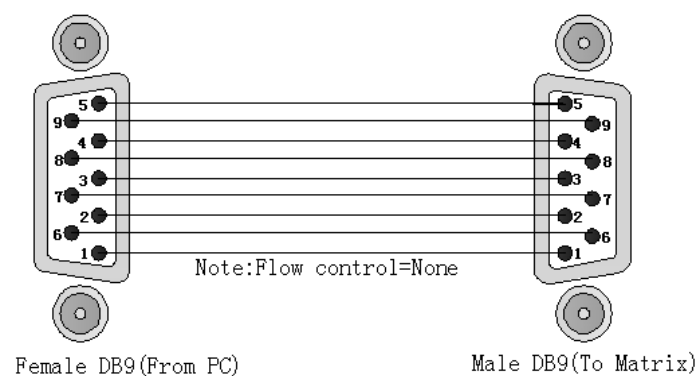


Figure 6-10 (b) RS-232 – From Female DB9 (PC) to Male DB9 (Matrix)

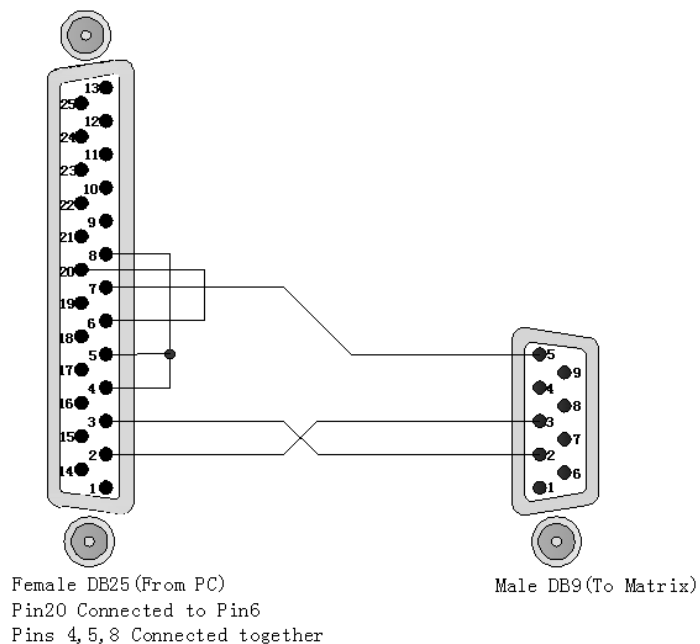


Figure 6-11 RS-232 – From Female DB25 (PC) to Male DB9 (Matrix)



### 6.6.2 RS-485

RS-485 is a standard defining the electrical characteristics of drivers and receivers for use in balanced digital multipoint systems. Digital communications networks implementing the RS-485 standard can be used effectively over long distances and in electrically noisy environments. This Matrix Switcher supports up to two RS-485 ports allows you to control more than one Matrix Switcher. If the master device is specified for LAN, it allows you to control all the series devices with web browser. Remember all the ID of each device upon series connection has to be uniquely.

See Pin definitions as below:

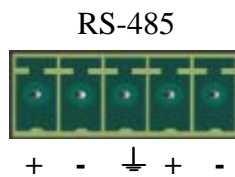


Figure 6-12 RS-485 Port

#### Serial connection between Matrix RS-485:

Pin1 TX (+)  $\longleftrightarrow$  TX (+) --- Transmitted Data +

Pin2 TX (-)  $\longleftrightarrow$  TX (-) --- Transmitted Data -

Pin3 Gnd  $\longleftrightarrow$  (Ground)

Pin4 RX (+)  $\longleftrightarrow$  RX (+) --- Received Data +

Pin5 RX (-)  $\longleftrightarrow$  RX (-) --- Received Data -

☞ RS-232 and RS-485 baud rates: 9600bps, no odd or even calibration address, 8bit data transmission address, 1bit stop address (96, N, 8, 1).

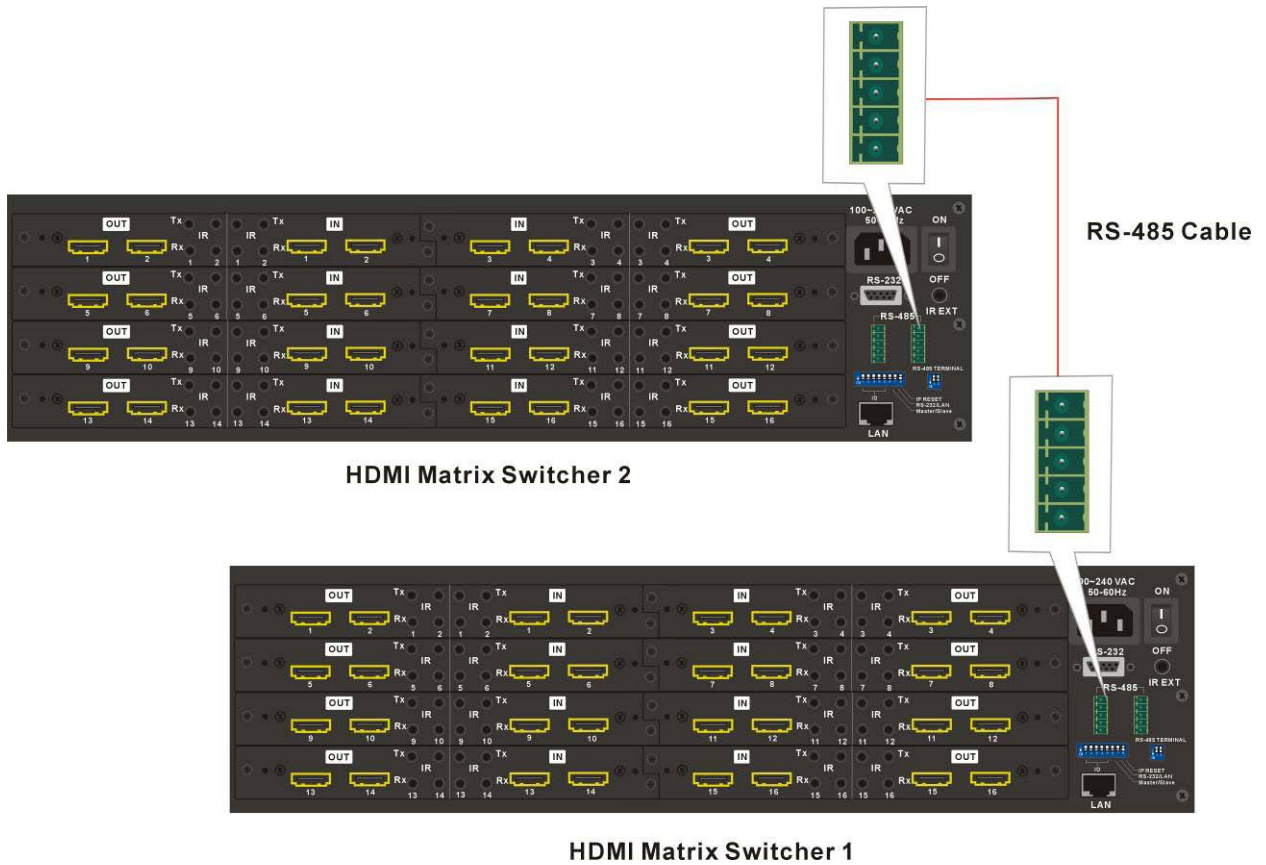


Figure 6-13 RS-485 Connection for Matrix Switcher

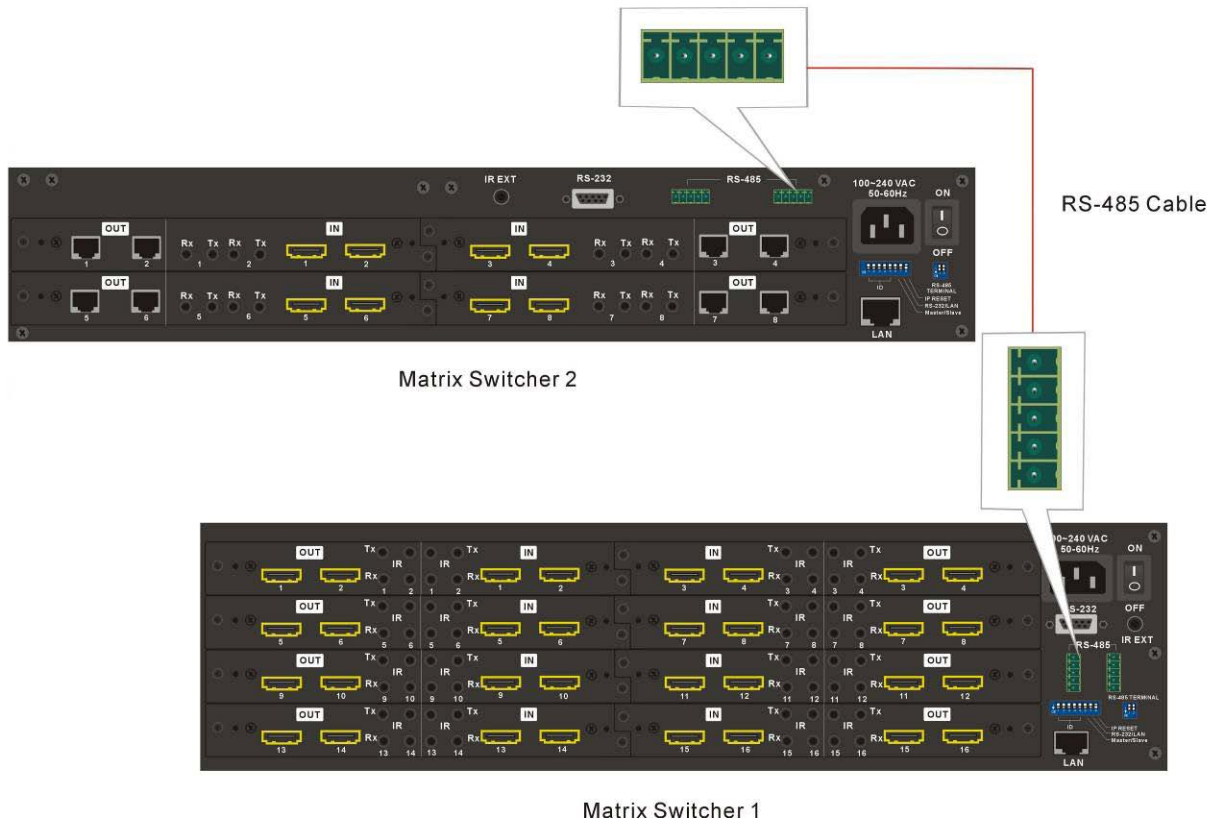


Figure 6-14 RS-485 Connection for Matrix Switcher1 and other Matrix Switcher

### 6.6.3 LAN Port

Matrix Switcher supports a network RJ45 registered jack using 8P8C modular connector, which specifies the physical male and female connectors as well as the pin assignments of the wires in a telephone cable. (A common LAN cable is available.)

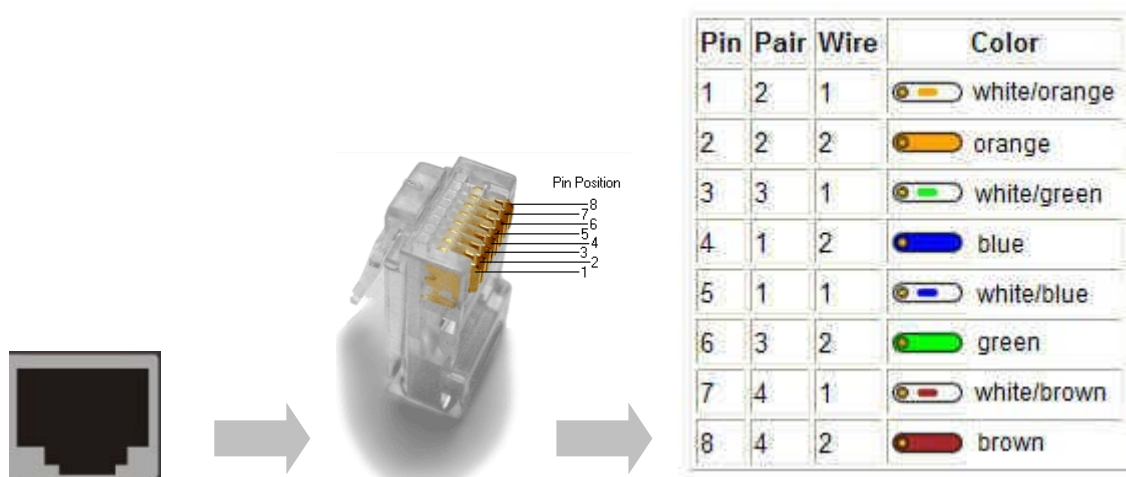


Figure 6-15 RJ45 Connector

### 6.6.4 DIP Switcher 8 Pins

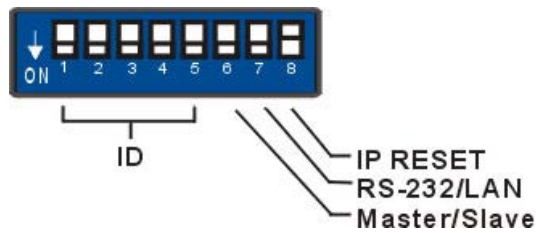


Figure 6-16 DIP Switcher

**A. DIP Switcher Pin 1 to 5:** Switch to down (ON) is specified for “0”, on the other hand to up (OFF) is specified for “1”. For Device ID settings refer to [6.6.6 Device ID Settings](#).

**B. DIP Switcher Pin 6:** Mater/Slave Enable/Disable. Only one Matrix Switcher can be connected to other device and control PC via RS-232/LAN that is specified as Master, others are specified as Slave.

ON: RS-485 Serial Master and RS-232 / LAN Enable.

OFF: RS-485 Serial Slave and RS-232 / LAN Disable.

**C. DIP Switcher Pin 7:** Switch between RS-232 port and LAN port connection.

ON: RS-232

OFF: LAN

**D. DIP Switcher Pin 8:** Reset the web server IP address to **192.168.0.3**

The steps are as below:

1. Please adjust the pin8 to ON and re-start Matrix.
2. After the Matrix re-starts about 10 seconds, shut down it.
3. For a normal operation, please adjust the pin8 to OFF, then power on Matrix again. The IP address will be restored to the default value: **192.168.0.3**

### 6.6.5 DIP Switcher 2 Pins



Figure 6-17 RS-485 Terminal Switcher

**DIP Switch RS-485 Terminator:** RS-485 Terminator for ON/OFF

ON: RS-485 Terminator ON.

OFF: RS-485 Terminator OFF.

Proceed Multi Matrix Switcher connections, the RS-485 Terminator for the last device must be set to ON. Others must be set to OFF.

## 6.6.6 Device ID Settings

### Device ID Settings

The Device ID determines the position of a Matrix system. When multiple Matrix products are connected to one PC or when the Matrix products are serially connected, the Device ID decides which Matrix product is to be controlled. Device ID must not set to same number. Use the ON/OFF switches 1, 2, 3, 4, 5 on the rear panel to set the ID number as below:

**Number Setting Table**

ID Address (Decimal)	ID Address (Hexadecimal)	ID Address (Binary)	ON/OFF Switching Positions				
			SW5	SW4	SW3	SW2	SW1
0	00	00000	ON	ON	ON	ON	ON
1	01	00001	ON	ON	ON	ON	OFF
2	02	00010	ON	ON	ON	OFF	ON
3	03	00011	ON	ON	ON	OFF	OFF
4	04	00100	ON	ON	OFF	ON	ON
5	05	00101	ON	ON	OFF	ON	OFF
6	06	00110	ON	ON	OFF	OFF	ON
7	07	00111	ON	ON	OFF	OFF	OFF
8	08	01000	ON	OFF	ON	ON	ON
9	09	01001	ON	OFF	ON	ON	OFF
10	0A	01010	ON	OFF	ON	OFF	ON
11	0B	01011	ON	OFF	ON	OFF	OFF
12	0C	01100	ON	OFF	OFF	ON	ON
13	0D	01101	ON	OFF	OFF	ON	OFF
14	0E	01110	ON	OFF	OFF	OFF	ON
15	0F	01111	ON	OFF	OFF	OFF	OFF
16	10	10000	OFF	ON	ON	ON	ON
17	11	10001	OFF	ON	ON	ON	OFF
18	12	10010	OFF	ON	ON	OFF	ON
19	13	10011	OFF	ON	ON	OFF	OFF
20	14	10100	OFF	ON	OFF	ON	ON
21	15	10101	OFF	ON	OFF	ON	OFF
22	16	10110	OFF	ON	OFF	OFF	ON
23	17	10111	OFF	ON	OFF	OFF	OFF
24	18	11000	OFF	OFF	ON	ON	ON
25	19	11001	OFF	OFF	ON	ON	OFF

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26	1A	11010	OFF	OFF	ON	OFF	ON
27	1B	11011	OFF	OFF	ON	OFF	OFF
28	1C	11100	OFF	OFF	OFF	ON	ON
29	1D	11101	OFF	OFF	OFF	ON	OFF
30	1E	11110	OFF	OFF	OFF	OFF	ON
31	1F	11111	OFF	OFF	OFF	OFF	OFF

# 7. Matrix Application Software

## 7.1 Software Introduction

The 《AV Matrix》 matrix control software applies to different input/output matrixes.

### 7.1.1 Software Description

The 《AV Matrix》 matrix testing software is an application tool developed for matrix testing and application. The software operation environment is as below:

- Window98/2000/NT/XP operating systems
- 32M internal memory or above
- 10M hard disk space or above
- CD-ROM
- At least one serial communication port

### 7.1.2 Software Activation

**Power on the computer:** Implement the **AV Matrix.msi** in the bundled CD-ROM to activate installation window as below, click “**Next**”. And follow the instructions on window to finish the installation.

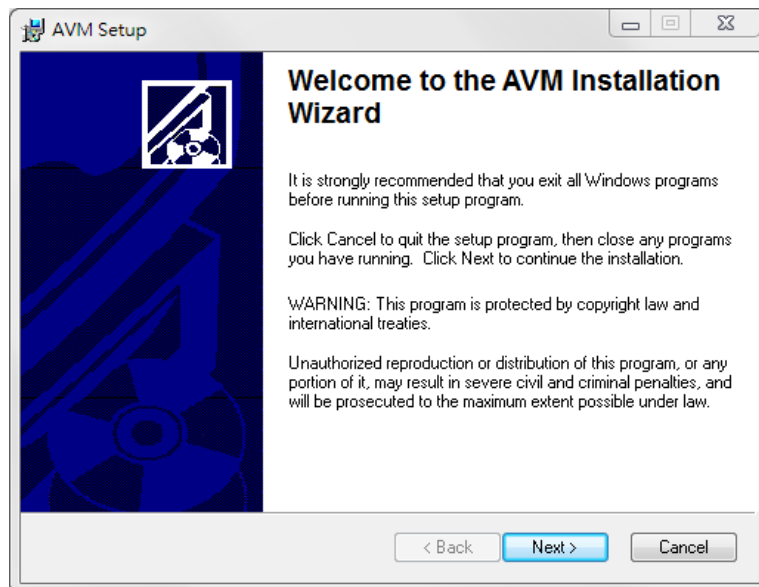
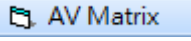


Figure 7-1 AV Matrix Installation Window

### 7.1.3 Connect Matrix Switcher and PC

You must power off the Matrix Switcher. Then, connect the Matrix RS-232 port to the PC RS-232 port with the bundled communication cable. And make sure the DIPs on the rear panel are set to Master and RS-232. (Refer to the previous section [6.6.1 RS-232](#))

## 7.2 Matrix Configuration

After finishing installation, click  to active AV Matrix Application. In the “Options” window, select the connected PC Port number and Baud rate, and then click “OK”.

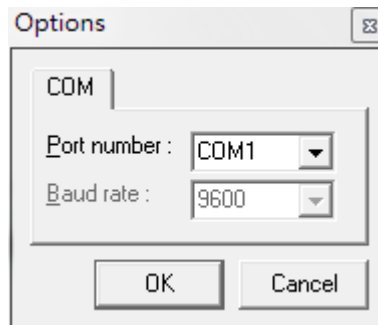


Figure 7-2 AV Matrix Options Window

The software controls signal connection between the corresponding input port and output port as required. The AV Matrix software application main window is shown as below:

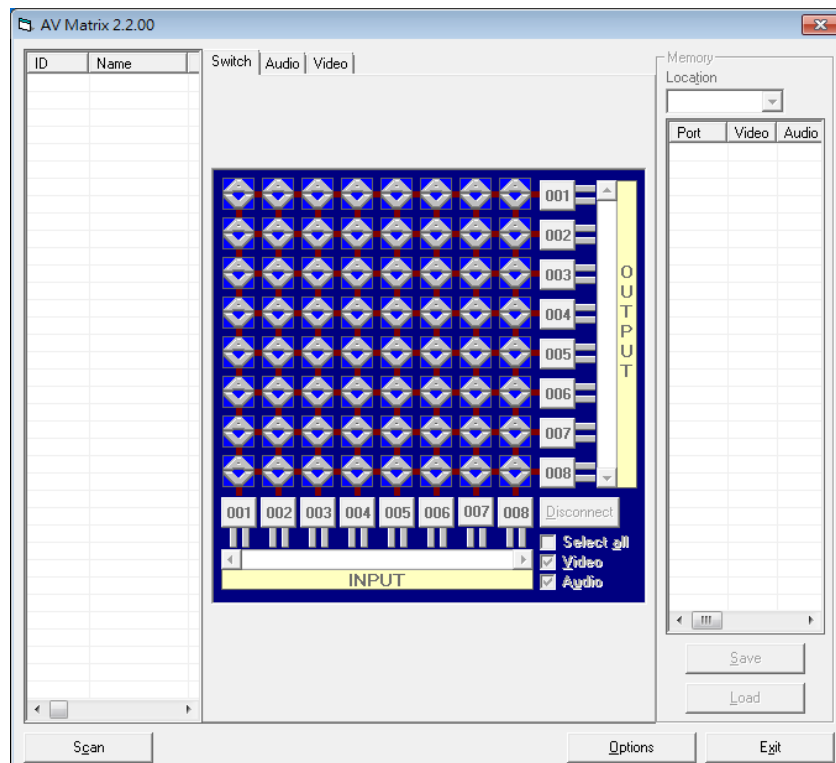


Figure 7-3 《AV Matrix》 Software Application Main Window



☞ The Device ID is based on the DIP of switcher located on the rear panel.

Slide the scrollbar on the lower left area of main window to view all contents (including ID, Name, A/V, I/O (only for VO/AO reference), Memory, VI Plug, AI Plug, VO Plug, AO Plug, EDID Type, Volume, Bass, Treble, Subwoofer, Delay, Delay Unit, Max Delay and Version) as described below:

- **ID:** Specify the ID address of Matrix Switcher.
- **Name:** The name of Matrix Switcher.
- **A/V:** Specify the character of audio or video. Or both of audio and video are supported will show “**Both**”.
- **I/O:** Ports quantities of Input and Output.
- **Memory:** Show the quantities of memory sets.
- **AI/VI Plug:** Enable to detect the status of all input ports for audio/video.
- **AO/VO Plug:** Enable to detect the status of all output ports for audio/video.
- **EDID Type:** **FIX** (fix mode) and **TV1** (access the first output channel) selection key.
  - **FIX mode:** The Matrix Switcher will supply a set of fixed **EDID** values to support up to only 1080P high performance TV.
  - **Output1 mode:** The Matrix Switcher will access the **EDID** values of high performance TV that connected to the first output channel, and copy the **EDID** value to all the input channels so that the DVD player can support to all the HDTV.
- **Version:** Show the version information of Matrix Switcher.

AO Plug	EDID Type	Vo
Disable	Disable	En

The functions as below are only for Audio Matrix Switcher (This Matrix Switcher is not supported):

- **Volume/Bass/Treble/Subwoofer:** Show the Volume/Bass/Treble/Subwoofer function is Enable or Disable.
- **Delay:** Show whether enable or disable the multimedia output delay time function.
- **Delay Unit:** Show the delay time of multimedia output. The unit for delay time is “**ms**”.
- **Max Delay:** Show the maximum permissive delay time. The unit for maximum delay time is “**ms**”.



## 7.2.1 Main Operation Interface

Refer to the main window as above, the marked blue area shows crossing matrix of output ports 001-016 and input ports 001-016. You can slide the scrollbar on the **Input / Output** area to view all configured ports. For the basic operation is described as below:

Examples for selecting Matrix Switcher functions:

**Example:** Now there is a Matrix Switcher having all the input/output ports properly connected to the equipment. If you want to set channel 1 input to channel 2, 3 and 4 output; channel 3 inputs to channel 1 output. There are 2 ways to implement the switching. Please follow the ways and steps to finish the switching functions:

- **First way:**

Directly click on the corresponding icons on the Matrix  to transform them into  to complete the switching operation.

- **Second way:**

**Step 1:** First select the “**Output**” number keys 002, then select 003 and final select 004 to the right of the blue configuration area, and select the “**Input**” number key 001 to the bottom. Then, press consecutively the previously selected “**Output**” number keys 002, 003 and 004. This way, you have selected “**Input**” 001 and “**Output**” 002, 003 and 004 switching.

**Step 2:** First select the “**Output**” number key 001 to the right of the blue configuration area, and select the “**Input**” number key 003 to the bottom. Then, press the previously selected “**Output**” number key 001. This way, you have selected Input 03 and Output 001 switching.

Upon completion of the above steps, you have actually completed the switching operation of having channel 1 input to channel 2, 3 and 4 outputs while at the same time successfully switched from channel 3 input to channel 1 output.

The main configuration window also shows you some function buttons to easy operation:

- **Switch Tab:** Click “**Switch**” tab to show the main configuration window.
- **Audio Tab:** Click the “**Audio**” tab to show the audio related configuration window.
- **Video Tab:** Click the “**Video**” tab to show the video related configuration window. For more information, refer to [7.2.4 EDID Configuration Function.](#)

- **Disconnect:** To disable the connections. After you had configured the connection between input and output ports, you can click this button to disable the connections
- **Select all output:** Click this button to select all output ports including output 001~008 or 001-016.
- **Video check box:** Used for video configurations.
- **Audio check box:** Used for audio configurations.
- **Scan:** To search the device controlled by the AV Matrix Application configuration. When the device name located on the left of main configuration window is empty, you can click the **Scan** to research and update the device **ID** and **Name** and other related information. End the **Scan** function by pressing the Scan again during scanning process. And the left of main configuration window will show you the detected information presently.
- **Options:** Allows you to configure the **Port number** and **Baud rate**.
- **Exit:** Click this button to exit the configuration window.
- **Save:** Click this button to save the connected combinations both output ports and input ports into the memory set.
- **Load:** Click this button to retrieve the previously saved settings.

For more information and operations, please refer to next chapters.

## 7.2.2 Disconnect Function Key

Disable all the unused output ports.

**A specific example of operation is described as below:**

The present input and output relations are shown in Figure 7-4 (a) below:

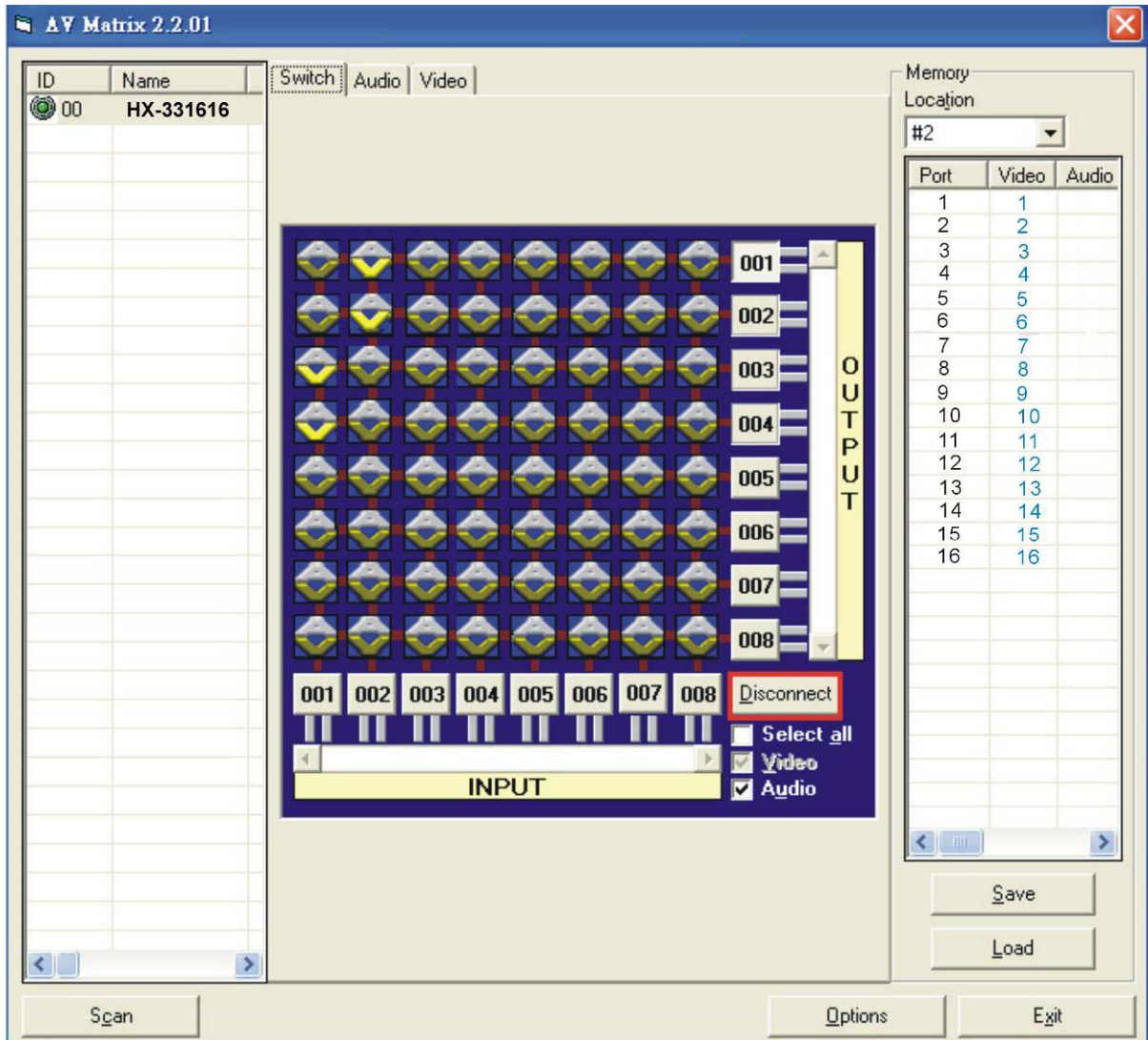


Figure 7-4 Disconnect Function Key (a)

Follow the steps as below to disable the output ports including port 003、002、and 001.

**Step 1:** First press down the output number keys 003, then 002 and final 001 to the right of the blue configuration area.

**Step 2:** Press the “Disconnect” key;

**Step 3:** Press the previously pressed output number keys 003, then 002 and final 001 to complete the operation.

The final results will be as shown in Figure 7-4 (b) below:

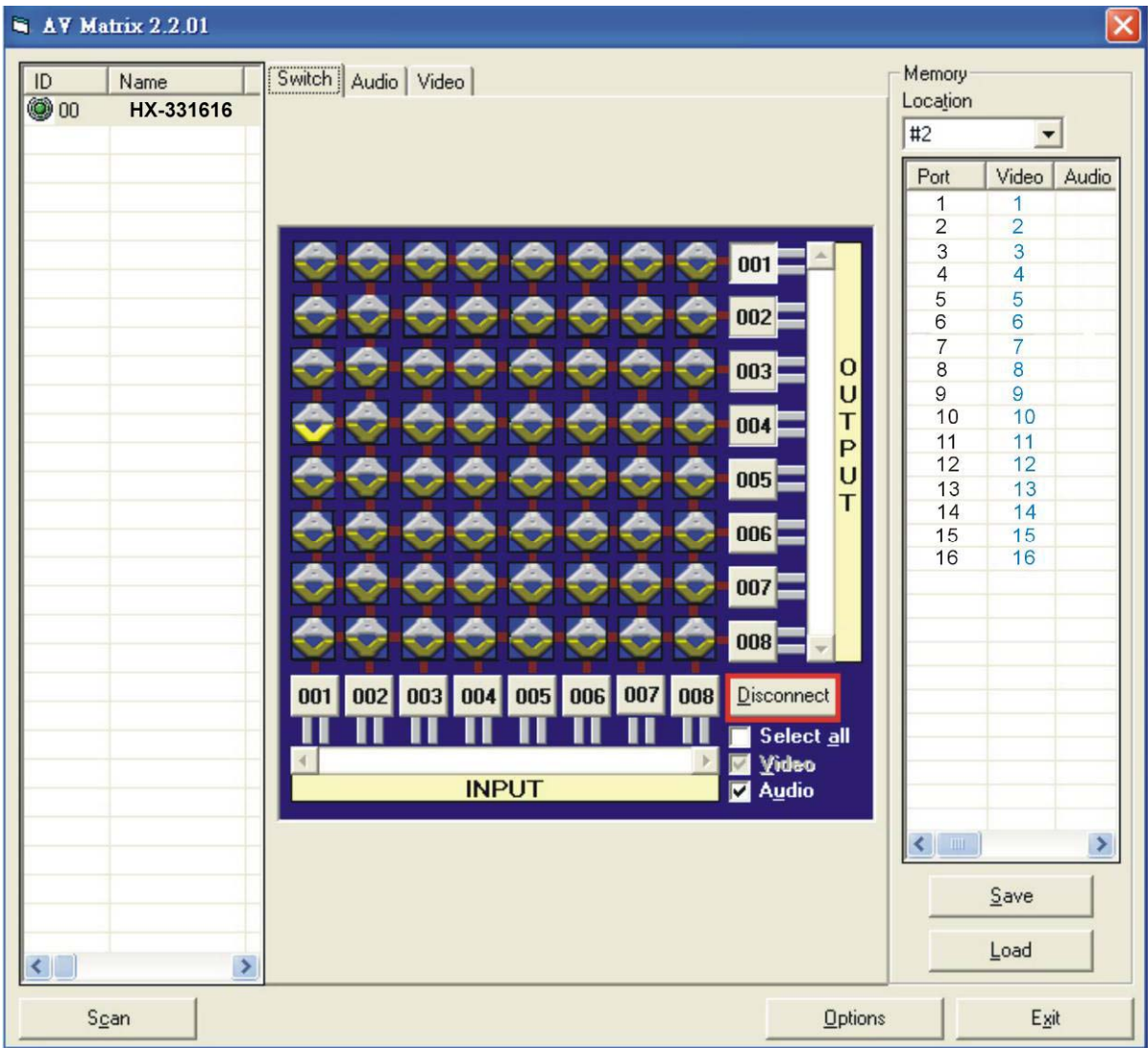


Figure 7-4 Disconnect Function Key (b)

### 7.2.3 Audio Configuration Function

This function is only for Audio Matrix Switcher, click **“Audio”** tab to enter the audio configuration window. In the audio configuration window allows you to adjust **Volume**, **Bass**, **Treble**, **Subwoofer** and **Delay** by sliding the scrollbar. You can also enable/disable the **“Mute”** function here.

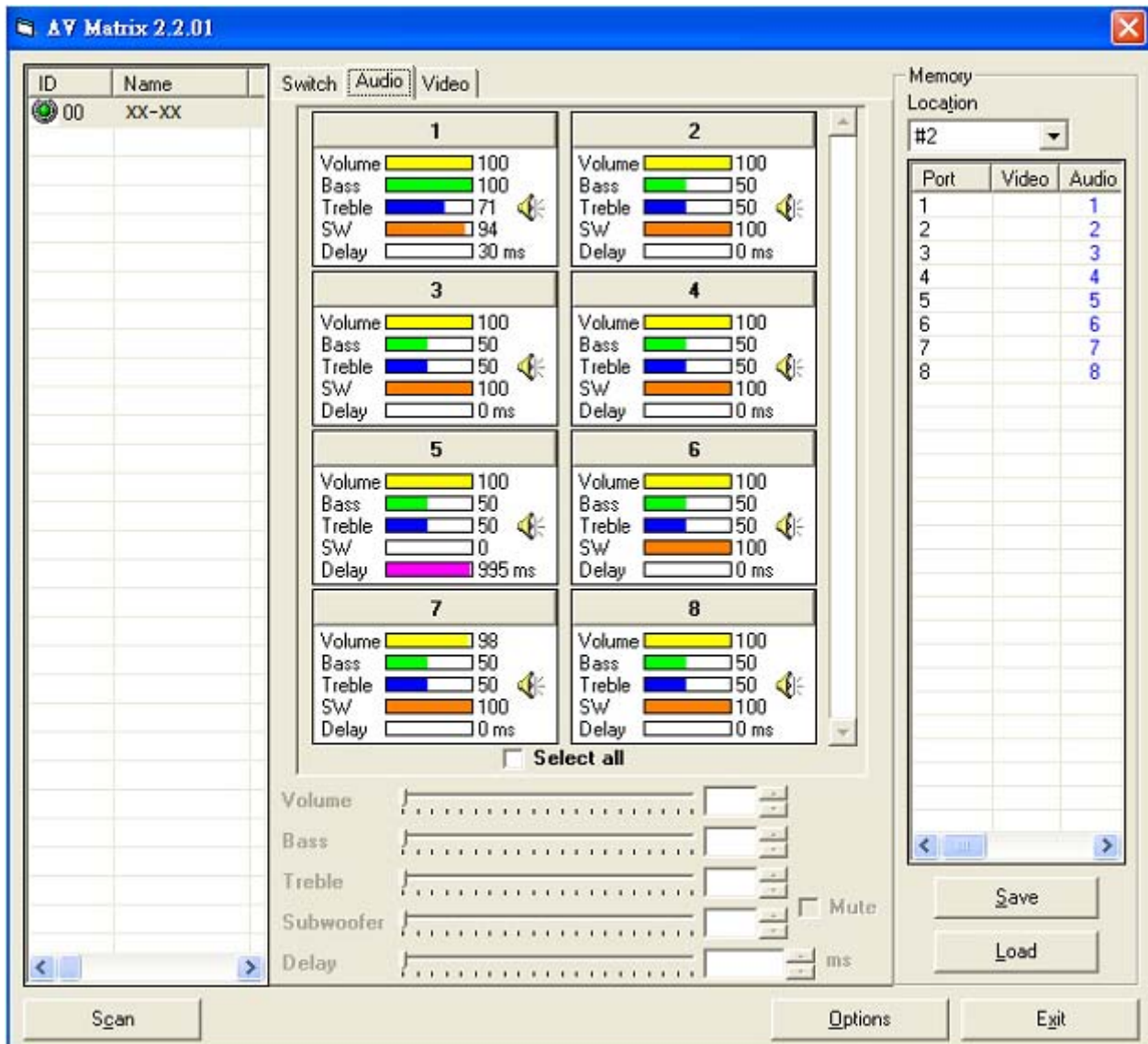


Figure 7-5 Audio Configuration Window

**Mute Function Description:** To mute the volume.

**A specific example of the Mute One Function is described below:**

Select one port configuration section as light blue block, then click **“Mute”** check box to

mute blocked section. The  icon will become .

☞ This function is only for Audio Matrix Switcher.



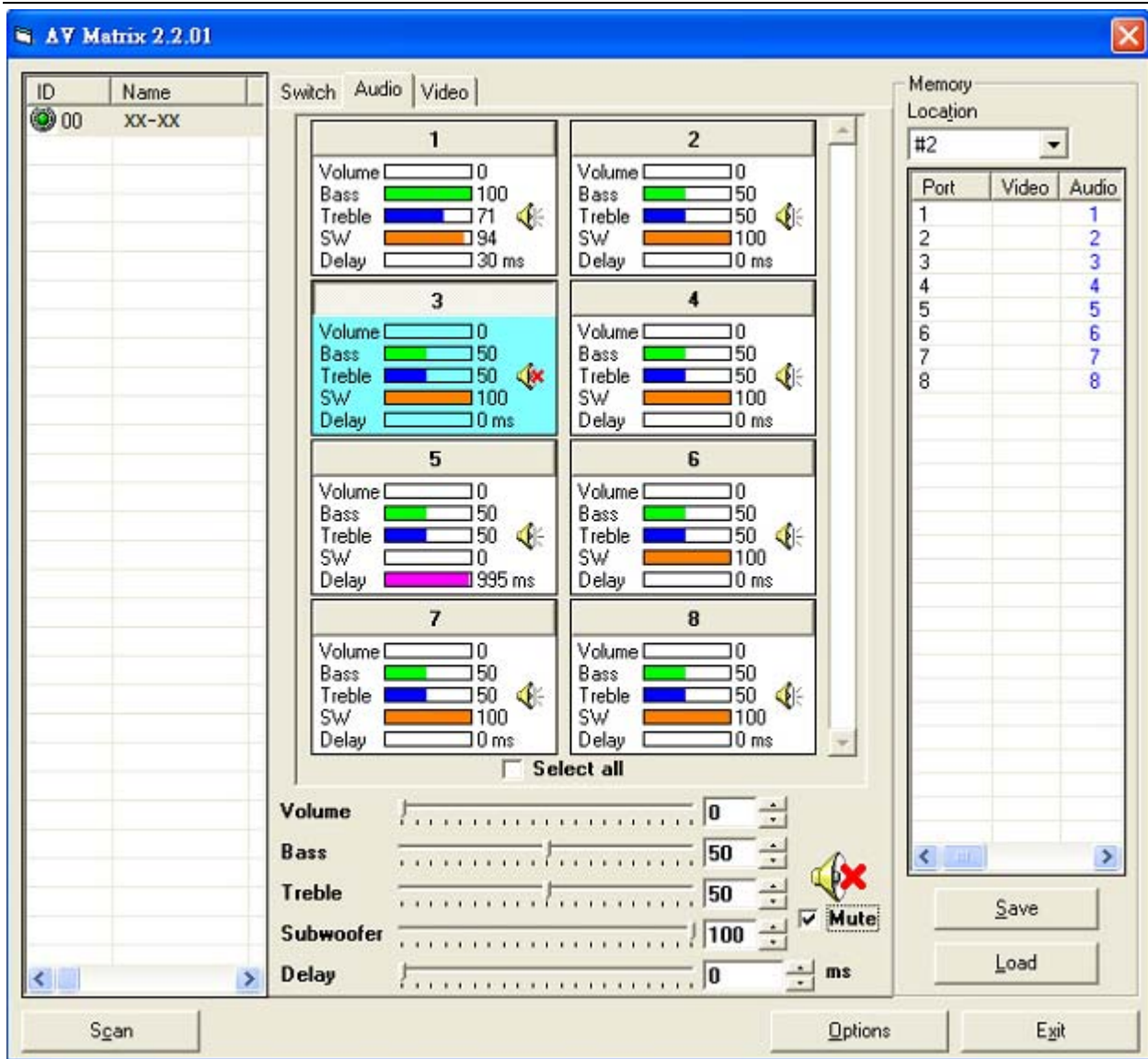



Figure 7-6 Mute One Port Configuration

**A specific example of Mute all function is described below:**

Click “**Select all**” check box, all of configuration sections will become as light blue block, then click “**Mute**” check box to mute all blocked sections. All of the  icon will become



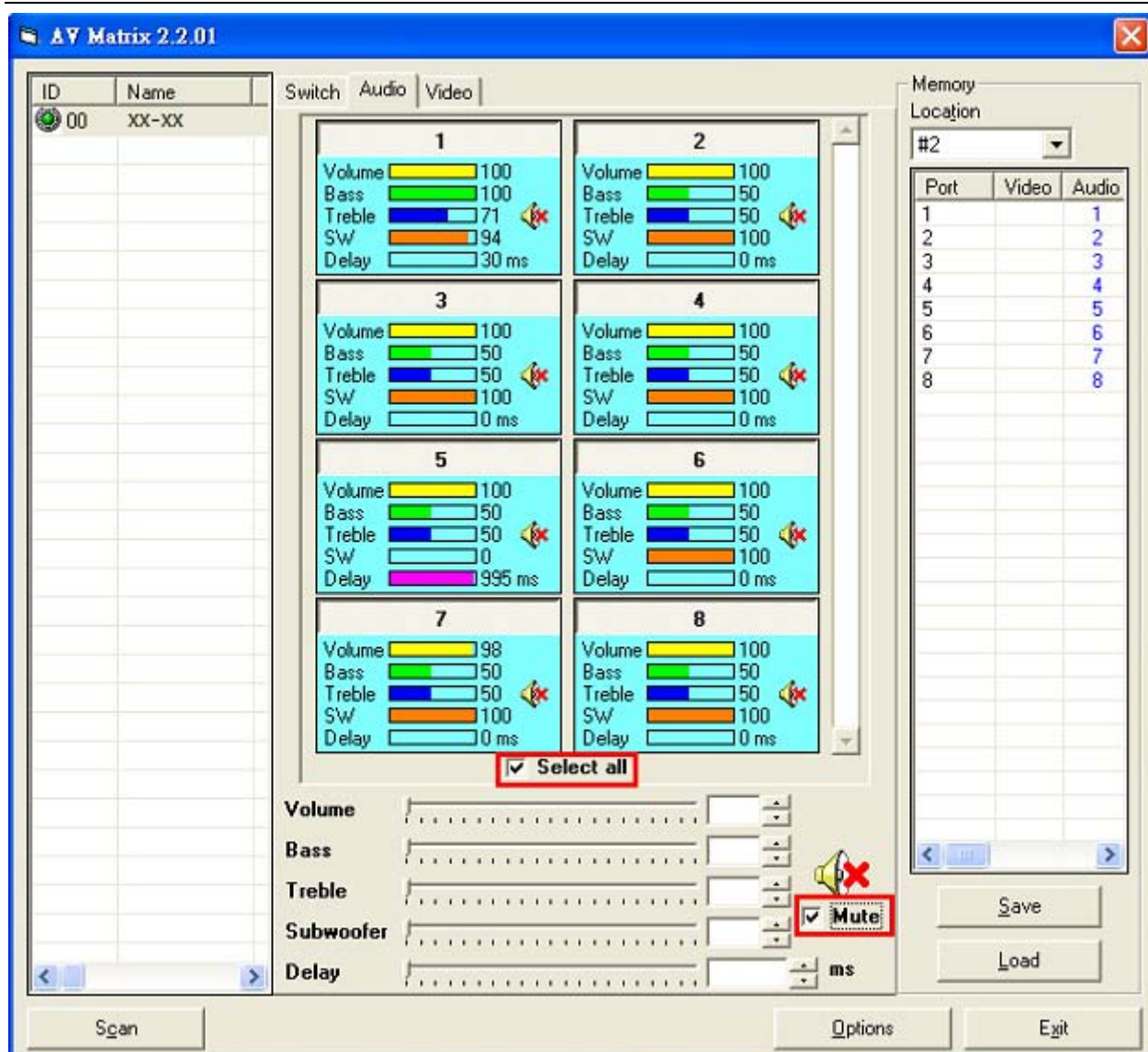


Figure 7-7 Mute All Ports Configuration



## 7.2.4 EDID Configuration Function

Click “**Video**” tab to enter the video configuration window. In the video configuration window allows you to configure the **EDID** type of channel as **FIX** or **Output1**. In HX-331616 Matrix Switcher, the audio and video can be processed synchronously. Beside, all ports for EDID functions are also processed entirely. You cannot configure the port separately.

**FIX mode:** The Matrix Switcher will supply a set of fixed **EDID** values to support up to only 1080P high performance TV.

**Output1 mode:** The Matrix Switcher will access the **EDID** values of high performance TV that connected to the first output channel, and copy the **EDID** value to all the input channels so that the DVD player can support to all the HDTV.

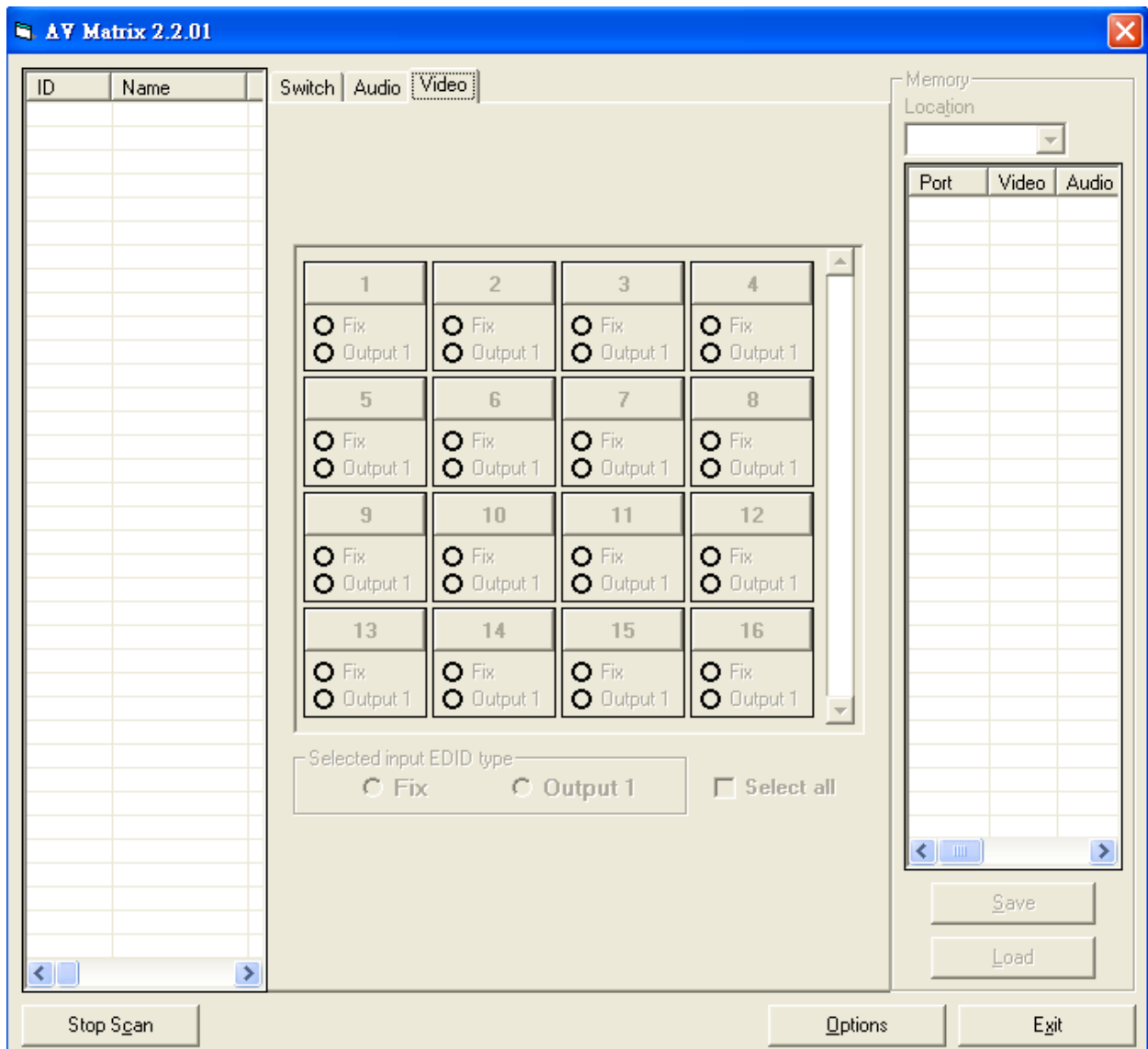


Figure 7-8 Video Configuration Window

## 7.2.5 RS-232 Memory Function

**Function Description:** To store and retrieve the settings.

**Memory Save Function Description:** The function saves all the present input/output switching relations to any Locations from #1 to #8 you desired.

**A specific example of the Store Function is described below:**

Store all the present input/output switching relations to Location #1. First, select Location #1, as shown below. Then click the **Save** key to save all the present input/output switching relations to Location #1.

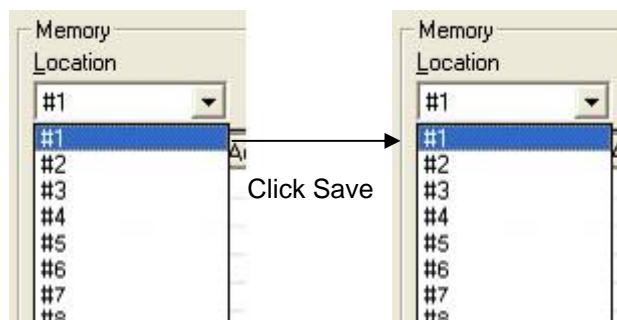


Figure 7-9

**Retrieve Function Description:** To retrieve the saved input/output switching relations.

**A specific example of the Retrieve Function is described below:**

To retrieve the all settings saved in Location #1. First, select Location #1 as shown in the figure below. Then click the **Load** key to retrieve all the settings stored in Location #1.

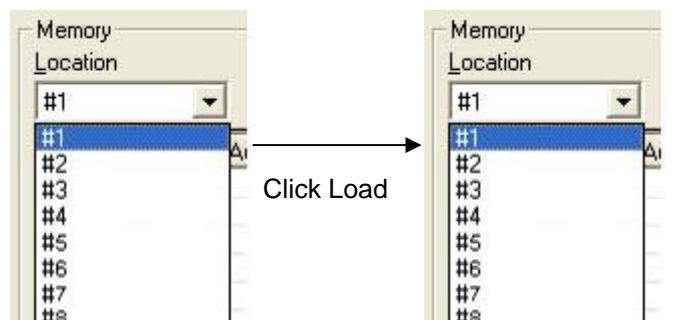


Figure 7-10

## 7.2.6 Options Function

### Activation Function:

In the main configuration menu, select **Options** to prop-up the **Options Window** as shown in Figure 7-11 (a)

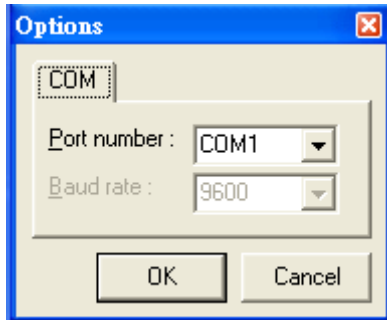


Figure 7-11 Options (a)

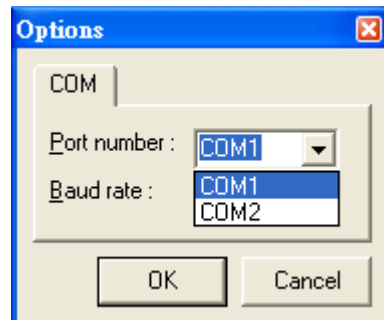


Figure 7-11 Options (b)

### Function Description:

**Linking Methods:** In “**Port number**” select one of the COM ports as shown in Figure 7-11 (b) for an example; in “**Baud rate**” select 9600 for signal transmission as shown in Figure 7-11 (a)

## 7.2.7 Other Application

In the right main window displays the presently saved switching status as shown in Figure 7-12 below:

Memory		
Location		
#1		
Port	Video	Audio
1	None	
2	1	
3	None	
4	None	
5	None	
6	None	
7	None	
8	None	

Figure 7-12 Memory Configuration Status

When input corresponding to Output is enabling, it shows the Output ports correspond to the Input ports; when they are disable it will show red “**None**” in the relative field.

## 7.2.8 Communication Protocol/Control Command Code

**Communication Protocol:** Baud rate 9600bps, no odd or even calibration bit address, 8bit transmission address, 1bit stop address. Please refer to the “**Command list.pdf**” in the CD-ROM for more relative **Command Code** information. Also see [Appendix D RS-232 Communication Protocol](#).

## 7.3 LAN Web Configuration

Open the **Browser** on your PC, key in the default IP address: <http://192.168.0.3> to login the **AV MATRIX Control** configuration window. Once the default IP address is changed, please use the changed IP to login.

The software controls signal connection between the corresponding input port and output port as required. The LAN main configuration window is as below:

Figure 7-13 LAN Web Configuration Window

☞ The Matrix is integrated HDMI switching equipment. You can only key in the Output Channel No. into the **Video** field for configuration.

☞ The Matrix Device ID is based on the DIP of switcher located on the rear panel. Beside, please adjust the DIPs to LAN and Master for the web control device.

- **Set:** Click this button to set the connected combinations both output and input ports.
- **OFF:** Disable the entire output channels.
- **Refresh:** To refresh the values of the configuration window. Any changed settings directly on the Matrix Swit. equipment will not respond to the AV Matrix operating interface, you have to click the “**Refresh**” button to refresh the configuration window so that showing the changed values.
- **Load:** Click this button to retrieve the previously saved settings.
- **Scan:** To search the device controlled by the LAN Web Configuration. When the **Console List** content is empty, you can click the “**Scan**” to research and update the Console List. If the connections of your Matrix Switcher are over to 8 devices, you can click “**Previous**” or “**Next**” to view console list by paging.

- **Upgrade:** Use for firmware upgrade. For more information, refer to [Appendix C Firmware Upgrade](#).
  - **Options:** Allow you to configure the **IP** address.
  - **Save:** Click this button to save the connected combinations output and input ports. It also includes the present input/output switching relations and all settings.
- ☞ For more relative information, refer to [5.1 Front Panel](#) as “**STO**” key function.
- **All Output:** A Hot Key for you to set the same value to all output channels. Select the **All Output** check box, then key in example “**5**” value in the channel 1 output. Click anywhere on the window, the all channels output will become “**5**” value.



Figure 7-14 All Output Check Box Function

- **AV Link:** Link between audio and video.
- **Key In:** A Hot key that is for key in the value 0~99 quickly. After setting the value, click “**Enable**” to take effect. For Matrix is useful from 1 to 8 values upon 8 output ports and HX-341616 is useful from 1 to 8 values upon 8 output ports.
- **Previous and Next:** If the connections of your Matrix Switcher are over to 8 devices, you can click “**Previous**” or “**Next**” to view the console list by paging.

### 7.3.1 Audio Configuration

For audio configuration, click **Audio** button directly to pop-up “**Audio Settings**” window. This function is only for Audio Matrix Switcher. For Audio button is useless for the Matrix (without audio configuration).



Figure 7-15 Audio Configuration

In “**Audio Settings**” window, you can select output port from the drop-down list. If you want to mute the volume, please select the **Mute** check box. You can also adjust the **Subwoofer**, **Bass**, **Treble** or **Lip-sync** value here.

If the Matrix Switcher does not support audio function, it will appear “---”.

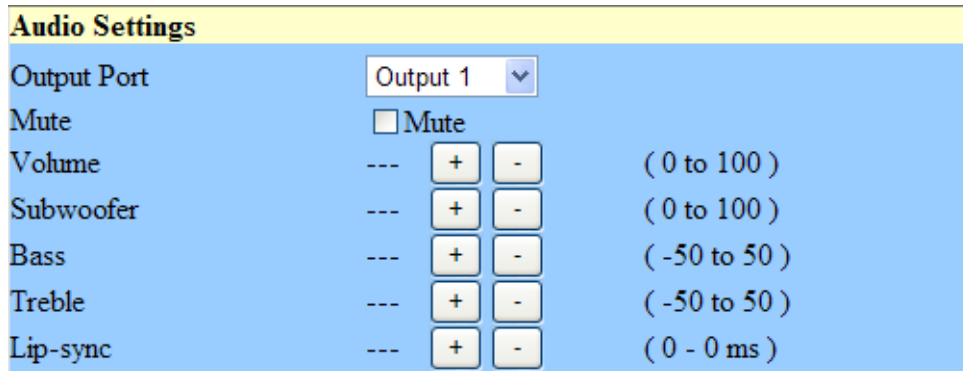


Figure 7-16 Audio Settings

### 7.3.2 Video Configuration

For video configuration, click **Video** button directly to pop-up “**Video Settings**” window.



Figure 7-17 Video Operation

In “**Video Settings**” window, you can click **Change** button to switch EDID Output1 and Default port.

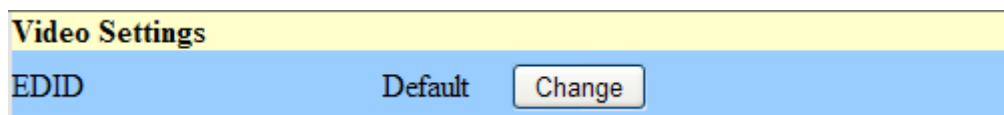


Figure 7-18 Video Configuration – Default Port Used

☞ The LCD will appear **FIX** when you switch to **Default**, alternately, it will appear **OUT1** with **Output1** selection.

If the Matrix Switcher does not support video function, it will appear “**Not Support**”. The **Change** button will useless.

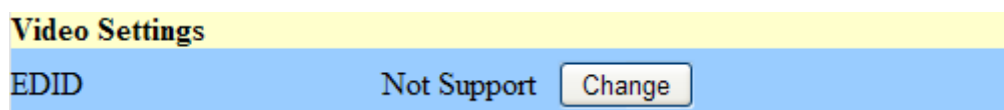


Figure 7-19 Video Configuration – Not Support

### 7.3.3 Device Status Information

Click **Status** button pop-up “**Device Status Information**” window as below.



Figure 7-20 Device Status

The “**Device Status Information**” window will show you **Device Name**, **Device ID**, **Firmware Version**, **Total Memory**, **Total Output** and **Total Input** information. Click “**Refresh**” button to renew related information in real time.

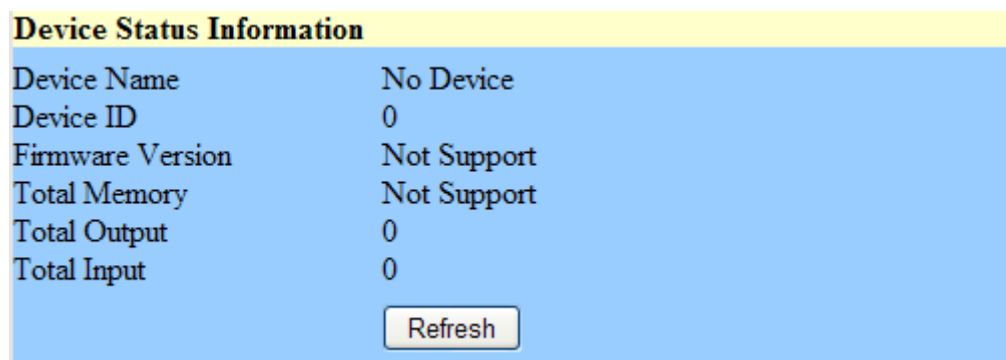






Figure 7-21 Device Status Information

### 7.3.4 Device Output View

When your Matrix Switcher supports more than 8 output ports, the output configuration view of browser application will over one page. Click  to go to the first page of output configurations,  to go to last page,  to go to prior one and  to go to next one as below:

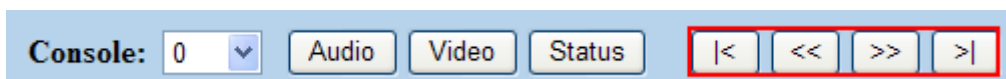


Figure 7-22 Output View



### 7.3.5 LAN Main Operation

Refer to the main configuration window, for the basic operation is described as below:

**Example:** Now there is an Matrix Switcher having all the input/output ports properly connected to the equipment. If you want to set channel 1 input to channel 2, 3 and 4 output; channel 3 inputs to channel 1 output.

The screenshot shows the 'AV MATRIX Control' interface. On the left, the 'Console List' table has one entry: ID 0, Name HX-331616. The main area shows 'Console: 0' with tabs for Audio, Video, and Status. The 'Audio' tab is active, displaying a grid for Output, Video, and Audio channels. The 'Output' row has buttons 1-8. The 'Video' row has buttons 3, 1, 1, 1, 5, 6, 7, 8. The 'Audio' row has empty buttons. Below the grid are checkboxes for 'All Output' and 'AV Link', and buttons for Set, OFF, Refresh, Load, Scan, Upgrade, Options, and Save. At the bottom, there are 'Key In' and 'Enable' sections with radio buttons for values 0-9. On the right, the 'Memory Information' table shows Output, Video, and Audio channels 1-8.

ID	Name
0	HX-331616

Console: 0 [Audio] [Video] [Status] [<] [ << ] [ >> ] [ > ]

Output	1	2	3	4	5	6	7	8
Video	3	1	1	1	5	6	7	8
Audio								

☐ All Output [Set] [OFF] [Refresh] [Load]  
☐ AV Link [Scan] [Upgrade] [Options] [Save]

Key In: ☐ 0 ☒ 10 ☐ 20 ☐ 30 ☐ 40 ☐ 50 ☐ 60 ☐ 70 ☐ 80 ☐ 90  
☐ Enable ☒ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9

Output	Video	Audio
1	1	
2	2	
3	3	
4	4	
5	5	
6	6	
7	7	
8	8	

Figure 7-23 AV Matrix Control

**Step 1:** For channel 2, 3, 4 Output, please key in the value “1” in the **Audio** fields.

**Step 2:** For channel 1 Output, please key in the value “3” in the **Audio** fields.

**Step 3:** Click “Set” button.

Upon completion of the above 3 steps, you have actually completed the switching operation of having channel 1 input to channel 2, 3 and 4 output while at the same time successfully switched from channel 3 input to channel 1 output.

### 7.3.6 LAN Memory Function

**Function Description:** To store and retrieve the settings.

**Store Function Description (STO/Save):** The **Store Function** saves all the present input/output switching relations to any Locations from #1 to #8 you desired.

**A specific example of the Store Function is described below:**

Store the present input/output switching relations to Location #2. First, select Location #2, as shown in the figure below. Then click the **Save** button to save the present input/output switching relations to Location #2.

**Retrieve Function Description (RCL/Load):** To retrieve the saved input/output switching relations.

**A specific example of the Retrieve Function is described below:**

To retrieve the input/output corresponding relations saved in Location #1. Select the Location #1 as shown in the figure below. The input/output corresponding relations stored in Location #1 will be showed directly.

The figure consists of two side-by-side screenshots of a software interface titled "Memory Information".

**Left Screenshot:** The "Location:" dropdown menu is open, showing a list of options from #1 to #8. Option #2 is highlighted. Below the dropdown is a table with two columns: "Output" and "Audio". The "Output" column contains numbers 1 through 8. The "Audio" column is empty.

Output	Audio
1	
2	
3	
4	
5	
6	
7	
8	

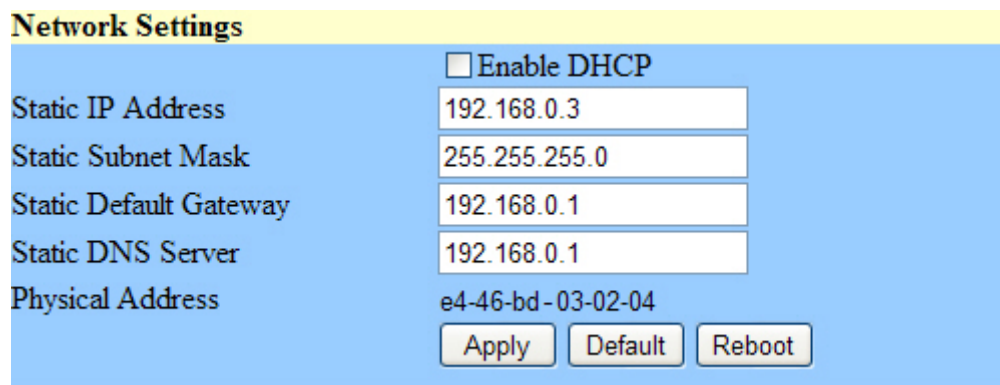
**Right Screenshot:** The "Location:" dropdown menu is closed, showing "#1" as the selected location. Below it is a table with three columns: "Output", "Video", and "Audio". The "Output" and "Audio" columns contain numbers 1 through 8. The "Video" column is empty.

Output	Video	Audio
1		1
2		2
3		3
4		4
5		5
6		6
7		7
8		8

Figure 7-24 Memory Information

### 7.3.7 LAN IP Function

In the main configuration menu, select **Options** button to prop-up the **Browser** ex. “**Windows Internet Explorer**” dialog box, click “**OK**” to show the IP configuration window as shown in Figure 7-25



Network Settings	
	<input type="checkbox"/> Enable DHCP
Static IP Address	192.168.0.3
Static Subnet Mask	255.255.255.0
Static Default Gateway	192.168.0.1
Static DNS Server	192.168.0.1
Physical Address	e4-46-bd-03-02-04
<input type="button" value="Apply"/> <input type="button" value="Default"/> <input type="button" value="Reboot"/>	

Figure 7-25 Network Settings

In the “**Network Settings**” window, you can set the IP information by yourself (Fix IP) or click the **Enable DHCP** check box to get the IP from the DHCP (Float IP).

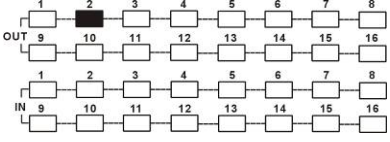
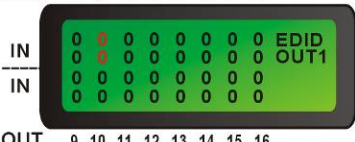
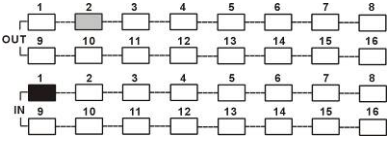
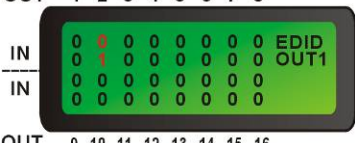
☞ Click the **Default** button to restore to default IP address. After changing the IP, you have to restart (power off then power on) the Device to make the changed values take effectively.

☞ You can also use the blue **Switcher** on the rear panel of the Device to reset the ignored IP.

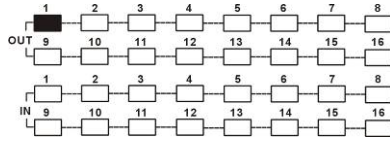
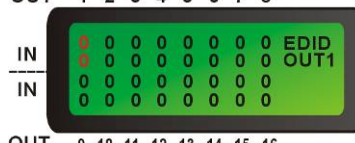
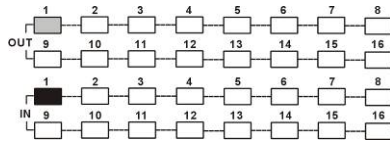
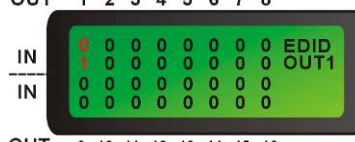
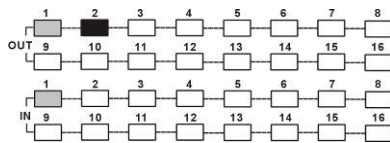
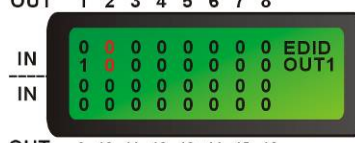
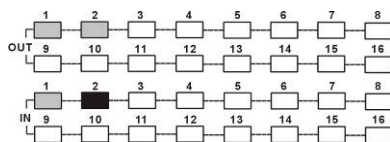
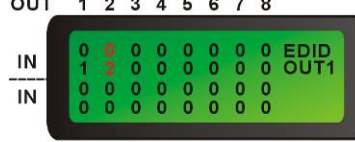


## 8. Operation Examples

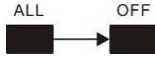
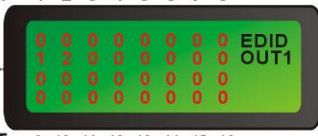
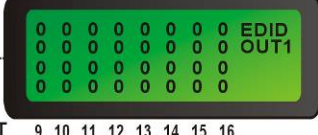
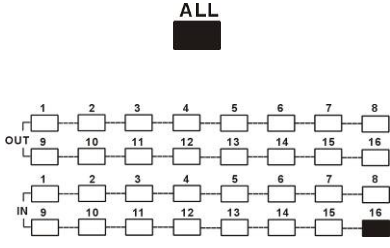
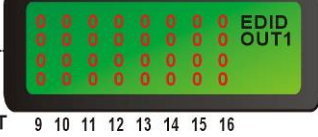
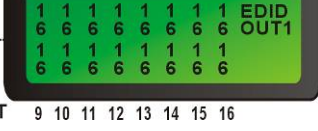
**Example 1:** Switch the NO.1 input signal to the NO.2 output channel.

Key	LCD Display	Operation
		1. Press the NO.2 key of the output channel, then the input channel will begin to flicker.
		2. Press the NO.1 key of the Input channel.


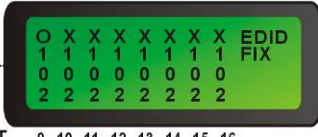
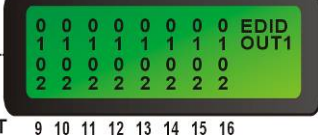
**Example 2:** Switch the NO.1 and NO.2 input signals to NO.1 and NO.2 output channels.

Key	LCD Display	Operation
		1. Press the NO.1 key of the output channel, then the input channel will begin to flicker.
		2. Press the NO.1 key of the Input channel.
		3. Press the NO.2 key of the output channel, then the input channel will begin to flicker.
		4. Press the NO.2 key of the Input channel.


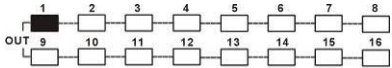
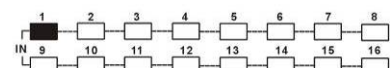

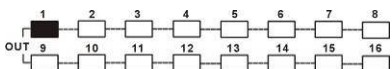
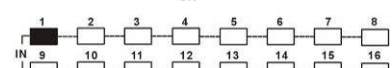
**Example 3: “All” settings.**

Key	LCD Display	Operation
	<p>OUT 1 2 3 4 5 6 7 8</p> <p>IN </p> <p>OUT 9 10 11 12 13 14 15 16</p> <p>OUT 1 2 3 4 5 6 7 8</p> <p>IN </p> <p>OUT 9 10 11 12 13 14 15 16</p>	1. Press the <b>ALL</b> key on the front panel, and then press the <b>OFF</b> key to cancel all the settings.
	<p>OUT 1 2 3 4 5 6 7 8</p> <p>IN </p> <p>OUT 9 10 11 12 13 14 15 16</p> <p>OUT 1 2 3 4 5 6 7 8</p> <p>IN </p> <p>OUT 9 10 11 12 13 14 15 16</p>	2. Press <b>ALL</b> key then select input 1~16 that indicate all outputs will switch to selected inputs. <b>E.g.</b> Input is 16.



**Example 4: “EDID” functions.**

Key	LCD Display	Operation
	<p>OUT 1 2 3 4 5 6 7 8</p> <p>IN </p> <p>OUT 9 10 11 12 13 14 15 16</p> <p>OUT 1 2 3 4 5 6 7 8</p> <p>IN </p> <p>OUT 9 10 11 12 13 14 15 16</p>	Press the <b>EDID</b> key to switch FIX and OUT1, refer to <a href="#">EDID</a> .

**Example 5: “STO” and “RCL” functions.**


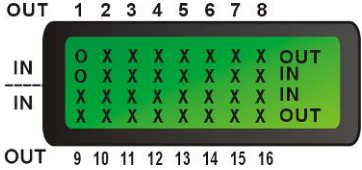
Key	LCD Display	Operation
<p>STO</p> 	<p>OUT 1 2 3 4 5 6 7 8</p> <p>IN <b>Memory Control Menu</b></p> <p>IN Store to Memory:</p> <p>IN 1 2 3 4 5 6 7 8</p> <p>OUT 9 10 11 12 13 14 15 16</p>	1. Press the <b>STO</b> key on the front panel. The <b>Store to Memory</b> begins to flicker about 8 seconds.
 <p>OR</p> 	<p>OUT 1 2 3 4 5 6 7 8</p> <p>IN <b>Memory Control Menu</b></p> <p>IN Store to Memory:</p> <p>IN Save to 1</p> <p>OUT 9 10 11 12 13 14 15 16</p>	2. Press the IN1 key or OUT1 key to save the setting in the NO.1 memory location.
<p>RCL</p> 	<p>OUT 1 2 3 4 5 6 7 8</p> <p>IN <b>Memory Control Menu</b></p> <p>IN Recall from Memory:</p> <p>IN 1 2 3 4 5 6 7 8</p> <p>OUT 9 10 11 12 13 14 15 16</p>	3. Press the <b>RCL</b> key on the front panel, The <b>Recall from Memory</b> begins to flicker about 8 seconds.
 <p>OR</p> 	<p>OUT 1 2 3 4 5 6 7 8</p> <p>IN <b>Memory Control Menu</b></p> <p>IN Recall from Memory:</p> <p>IN Load from 1</p> <p>OUT 9 10 11 12 13 14 15 16</p>	4. Press the IN1 key or OUT1 key to Load the previously saving.

**Example 6: “STO” and “RCL” combinations – restore to factory default values.**


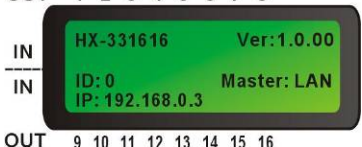
Key	LCD Display	Operation
<p>STO + RCL</p>  + 	<p>OUT 1 2 3 4 5 6 7 8</p> <p>IN <b>Reset Configuration</b></p> <p>IN Are you sure to</p> <p>IN Reset all settings?</p> <p>IN Press &lt;STO&gt; to reset.</p> <p>OUT 9 10 11 12 13 14 15 16</p>	1. Press and hold the <b>STO</b> and <b>RCL</b> keys about 2~3 seconds simultaneously on the front panel to restore all settings to factory default values. Follow the screen information, press “ <b>STO</b> ” key to begin resetting.
	<p>OUT 1 2 3 4 5 6 7 8</p> <p>IN 0 0 0 0 0 0 0 0 EDID</p> <p>IN 1 2 3 4 5 6 7 8 OUT1</p> <p>IN 0 1 1 1 1 1 1 1</p> <p>IN 9 0 1 2 3 4 5 6</p> <p>OUT 9 10 11 12 13 14 15 16</p>	2. After finish resetting, All of settings will restore to the factory default values.






**Example 7: “PLUG” function.**

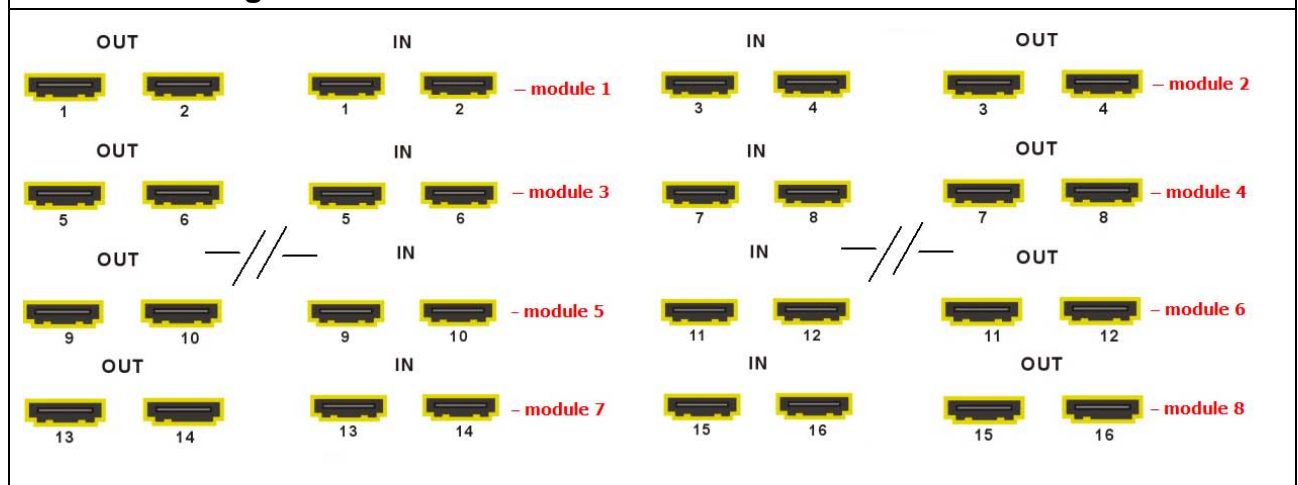
Key	LCD Display	Operation
<p><b>PLUG</b></p> 		Press the <b>PLUG</b> key individually to show you the status of HDMI jack. “O” is specified for the HDMI jack is used and “X” is specified for unused.

**Example 8: “INFO” function.**

Key	LCD Display	Operation
<p><b>INFO</b></p> 		Press the <b>INFO</b> key individually to show you the device information.

**Example 9: “PLUG” and “INFO” combinations.**

Key	LCD Display	Operation
<p><b>PLUG</b> + <b>INFO</b></p> 		1. Press the <b>PLUG</b> and <b>INFO</b> keys simultaneously on the front panel. The screen will show you the firmware version of module.
		2. If one of modules firmware upgrade is fail, the screen will show you “V0.0.00” error information.

**Modules Configuration**



## 9. Troubleshooting

1. What to do if LCD is fail in display?

**Answer:** Check the connection of power cord is not loosening and the power cord is in a good status having no any damage. Check the power source is normally.

2. What to do if the HDMI Matrix front panel keys switching not responsive?

**Answer:** The HDMI Matrix front panel keys employ scanning testing and require longer response time. Press the keys for 2 seconds and then release. This way, key switching will be responsive in operation.

3. What to do if the serial port (usually refer to the computer serial port) fails to control the HDMI Matrix?

**Answer:** Check that the communication port set by the control software is correctly connected to the corresponding serial port of the equipment. Also, check if the computer communication port is in good order. Check the ID address and DIP Switcher are configured correctly. Refer to [6.6.6 Device ID Settings](#) and [6.6.5 DIP Switcher 2 Pins](#).

4. What to do if the corresponding audio signal fails to output during HDMI Matrix switching?

**Answer:**

- (1) Check if there is signal on the input end. If there is no input signal, it could be that the input connection cable is broken or the connector gets loosen. You are advised to replace the connection cable.
- (2) Check if there is signal on the output end. If there is no output signal, it could be that the cable is broken or the connector gets loosen. You are advised to replace the connection cable.
- (3) Check if the output port number is the same as the controlled port number.
- (4) Check the connections of input and output ports are correctly.
- (5) If none of the above circumstances happen, it could be internal failure of the product itself. You must send for repair by qualified technical engineers.

5. What to do if you sense the power leakage during plugging or unplugging of the input/output ports?

**Answer:** It could be that the equipment power is not properly grounded. You must properly ground your equipment; otherwise product life can easily be shortened.

6. What to do if the HDMI Matrix panel keys and communication ports are out of order?

**Answer:** Check if the equipment power input is in good contact and the computer communication ports are in good order. If yes, it could be some internal failure of the product, please send for repair by qualified technical engineer.

7. What to do if operation and function failure occurred?

**Answer:** Check if the equipment and the Matrix system are in proper connection. If the problem persists, send the product to the maintenance center for repair.

8. How to avoid the equipment failure due to the high temperature?

**Answer:** Place the equipment in a ventilate location. If it is still not to be improved, please check with the build-in fan whether is damaged. Or contact your agency for helping.

9. What to do if IR function failure occurred?

**Answer:** Check the remote controller is in a fully battery and the IR connector is not loosening. Check whether the remote controller is aiming at the IR receiver accurately.

## Appendix A Matrix Switcher Remote Controller

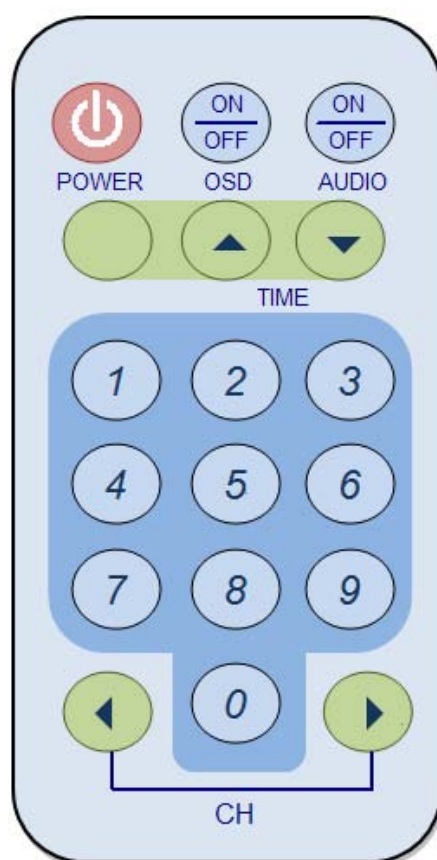
The Matrix Switcher supports a remote control interface allows you to control the channels and video features switch of Matrix Switcher through remote controller.



- **OSD, SCAN, ▲, ▼, AUDIO, VIDEO** and **+10** keys are useless.
- **ID** key is the same as “**INFO**” function on the front panel.
- **Power** key is the same as “**RETURN**” function on the front panel except for on the main screen status. On the main screen, press **Power** key can disable the LCD light.

## Appendix B IR Mini-Controller

The Matrix supports an IR Mini-Controller to allow you to select input channel through to current output IR Rx port with an extended connection - IR Receiver Cable. The signal for IR Mini-Controller is only available to the IR Receiver Cable connected on the OUT1~OUT16 IR Rx port. The IR Receiver Cable connected on the IN1~IN16 IR Rx port or IR EXT port is useless. If there are over 2 output IR receivers receive the signal, all of them will be switched to the same selected input simultaneously. In order to avoid the event occurs described above, you can configure the positions of your IR receivers based on different environments. The IR Mini-Controller is optional.



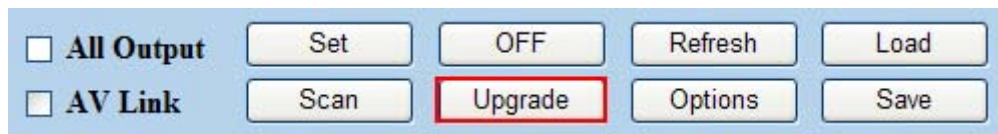
- **0~9** keys are used for channel selection.
- ◀ and ▶ keys are used to increase or decrease channel . ◀ is specified to decrease channel, alternately, ▶ is specified to increase channel. For example, press ▶ keys to add increased 1 channel to channel16; it will go back to channel 1. Otherwise, if you are in channel 1, you can press ◀ key to go to channel 16.
- Press Power key to switch to “**0**” (**OFF**).
- Other keys are useless.
- For channel configurations, e.g. channel 1, you can press “1” key and wait about 3 seconds, alternately, you can also press “01” keys to switch channel directly.

## Appendix C Firmware Upgrade

This Chapter will introduce you how to upgrade firmware on your web browser. For firmware upgrade, you have to upload the firmware file to your web server and then upload it to your device from web server.

Follow the steps as below to upgrade the firmware:

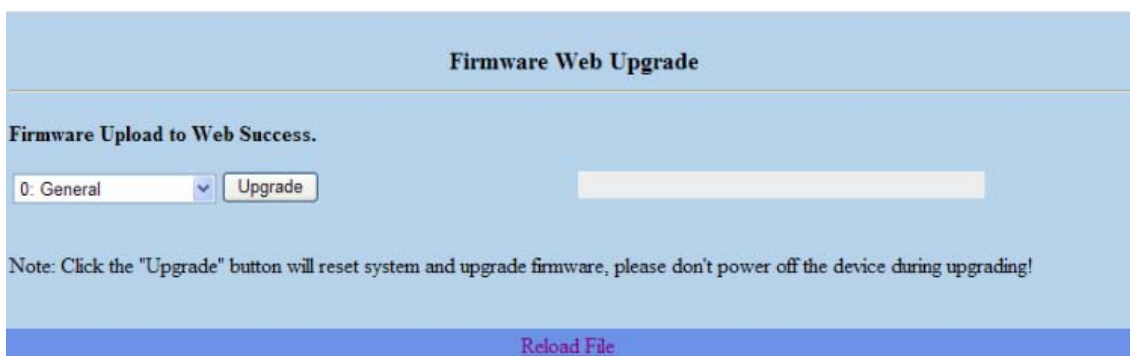
1. Open the **Browser** on your PC, key in the default IP address: <http://192.168.0.3> to login the AV MA TRIX Control configuration. Click **“Upgrade”** to begin firmware upgrade.



2. Click **“Browser”** to select upgraded .bin firmware, then click **“Upload”** to upload the firmware to web server.



3. Select **“0: General”** form the drop-down list and click **“Upgrade”** to upload the firmware to your device.



- ☞ For **0: General** selecting, you have to adjust the switcher ID on the real panel to “0” that means the device with ID “0” will be upgraded.
4. For **1: Matrix Device** will allow you to select target device based on ID 0 to 31 for upgrading firmware.

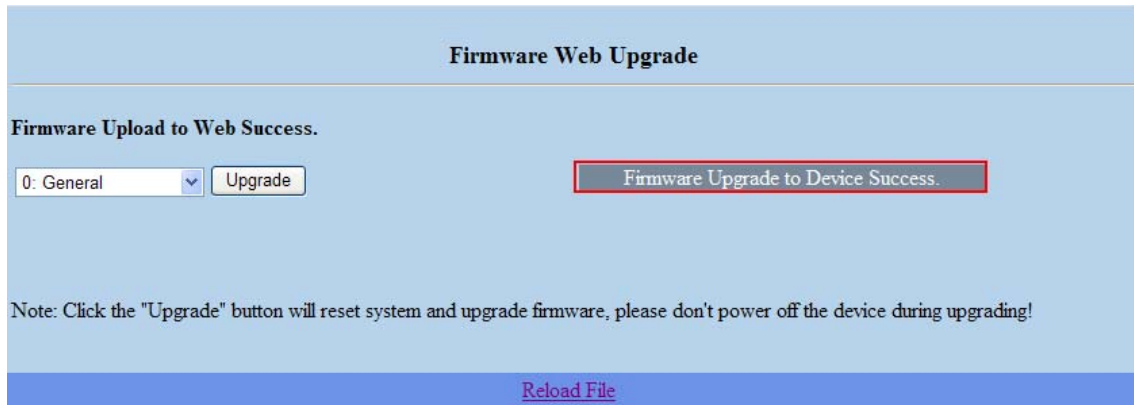
The screenshot shows the 'Firmware Web Upgrade' page. At the top, it says 'Firmware Upload to Web Success.' Below this, there is a dropdown menu labeled '1: Matrix Device'. Underneath, there is a 'Device ID:' label followed by a dropdown menu showing '0'. An 'Upgrade' button is located below the Device ID dropdown. At the bottom of the page, there is a note: 'Note: Click the "Upgrade" button will reset system and upgrade firmware, please don't power off the device during upgrading!' and a 'Reload File' link.

5. Select “**2: Matrix I/O Module**” will allow you to upgrade I/O modules. You have to decide which device you want to configure, and then select the suitable Device ID and I/O Module from the drop-down menu. Click “**Update**” to upgrade.

The image shows two side-by-side screenshots of the 'Firmware Web Upgrade' page for '2: Matrix I/O Module', connected by a large grey arrow pointing from left to right. Both screenshots show the 'Firmware Upload to Web Success.' header. The left screenshot shows the 'Device ID:' dropdown set to '0' and the 'I/O Module:' dropdown set to '1'. The right screenshot shows the 'Device ID:' dropdown set to '0' and the 'I/O Module:' dropdown set to '1'. Both screenshots have an 'Upgrade' button and a note at the bottom: 'Note: Click the "Upgrade" button will reset system and upgrade firmware, please don't power off the device during upgrading!'.

- ☞ HX-331616 supports 8 modules for upgrading; you have to upgrade each module individually.

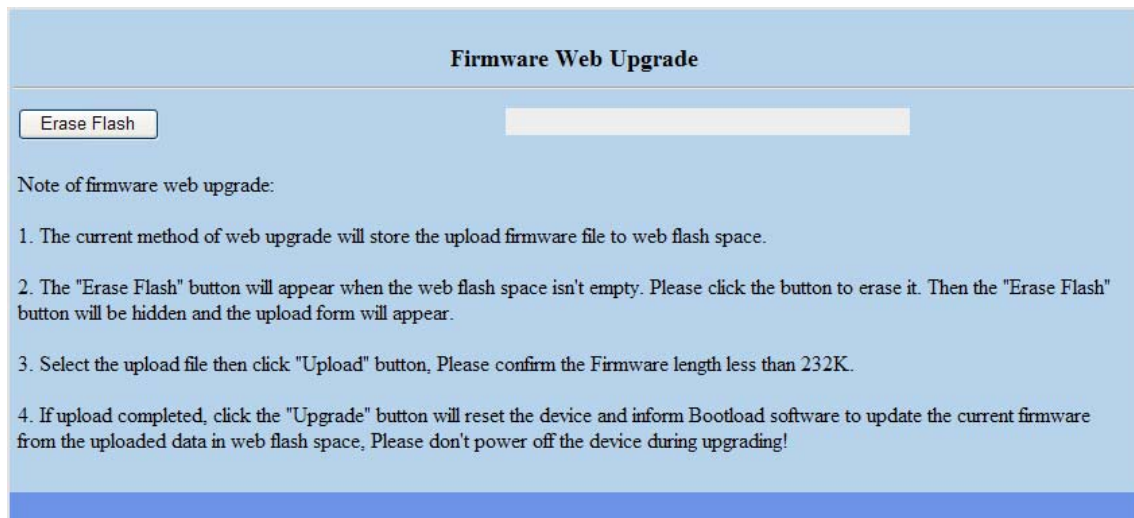
6. After finishing firmware upgrade successfully, **“Firmware Upgrade to Device Success”** information will appear as below.



The screenshot shows a web interface titled "Firmware Web Upgrade". Below the title, it says "Firmware Upload to Web Success." There is a dropdown menu set to "0: General" and an "Upgrade" button. A red-bordered box contains the text "Firmware Upgrade to Device Success." Below this, a note states: "Note: Click the 'Upgrade' button will reset system and upgrade firmware, please don't power off the device during upgrading!" At the bottom, there is a blue bar with a link labeled "Reload File".

Besides, the firmware upgrade will not stop even though the web connection is fail suddenly. Please check with the LCD screen to confirm the firmware upgrade has been finished successfully or wait at least 2 minutes then power off to restart your PC.

7. If there is a firmware already exists on the web server during firmware upgrade. The **“Erase Flash”** information window will appear to notice you to remove the existed firmware before upgrading the new one.



The screenshot shows a web interface titled "Firmware Web Upgrade". Below the title, there is an "Erase Flash" button and a progress bar. Below the button, it says "Note of firmware web upgrade:". There are four numbered instructions:
 

1. The current method of web upgrade will store the upload firmware file to web flash space.
2. The "Erase Flash" button will appear when the web flash space isn't empty. Please click the button to erase it. Then the "Erase Flash" button will be hidden and the upload form will appear.
3. Select the upload file then click "Upload" button, Please confirm the Firmware length less than 232K.
4. If upload completed, click the "Upgrade" button will reset the device and inform Bootload software to update the current firmware from the uploaded data in web flash space, Please don't power off the device during upgrading!

## Appendix D RS-232 Communication Protocol

This AV Matrix RS-232 communication protocol uses fixed length with 5 bytes of information as define below. The default baud rate is 9600 bps, no parity, 8 data bit and 1 stop bit. Command timeout is 300 milliseconds, and byte to byte timeout is 30 ms.

Use the RS-232 connecting cable to connect the computer serial port to the RS-232 communication port of the Matrix Switcher. The computer can control the Matrix Switcher via RS-232. Aside from using the front panel keys for operation, you are also permitted to use the RS-232 connection port for remote operation.

### D-1 Host Request

A standard command is 5 bytes:

*Device + Request + Index + Value + CRC*

Byte 1: Device Byte (DB)

Byte 2: Request Byte (RB)

Byte 3: Index Byte (IB)

Byte 4: Value Byte (VB)

Byte 5: CRC Byte (CB)

☞ Host must send CRC code to follow the last byte.

#### D-1.1 Device Byte

<i>Name</i>	<i>Bit 7</i>	<i>Bit 6</i>	<i>Bit 5</i>	<i>Bit 4</i>	<i>Bit 3</i>	<i>Bit 2</i>	<i>Bit 1</i>	<i>Bit 0</i>
<b>DB</b>	BT	0	1	Device ID (0 - 31)				

**BT:** Broadcast Command Flag.

0 - Instruction for Device ID only

1 - Instruction for all devices. (Device ID must be written 0)

☞ Devices will not response, when receiving the broadcast command.

**0:** Reserve, Always 0.

**1:** Identifier, Always 1.

**Device ID:** Device id ranges from 0 to 31. (Please refer to device's user manual)



## D-1.2 Request Byte

### Request Byte (RB)

<i>Name</i>	<i>Bit 7</i>	<i>Bit 6</i>	<i>Bit 5</i>	<i>Bit 4</i>	<i>Bit 3</i>	<i>Bit 2</i>	<i>Bit 1</i>	<i>Bit 0</i>
<b>RB</b>	0	0	Request Type (0 - 63)					

**Request Type:** Please refer to "Table - Host Request List".

**0:** Reserve, Always 0.

**Table - Host Request List**

<b>Request</b>	<b>Description</b>	<b>Index</b>	<b>Value</b>	<b>ACK</b>	<b>Note</b>
0x00	Dummy call	-	-	A	1, 2
Switch Tools					
0x01	Switch Video Output Channel	Output	Input	A	2
0x02	Switch Audio Output Channel	Output	Input	A	2
0x03	Store Video Status	Setting	Memory	A	2, 3
0x04	Store Audio Status	Setting	Memory	A	2, 3
0x05	Recall Video Status	Setting	Memory	A	2
0x06	Recall Audio Status	Setting	Memory	A	2
0x07	Request Video Output Channel	Output	Memory	B	
0x08	Request Audio Output Channel	Output	Memory	B	
Plug Detect					
0x09	Request Video Input Plug Status	Input	0	B	
0x0A	Request Audio Input Plug Status	Input	0	B	
0x0B	Request Video Output Plug Status	Output	0	B	
0x0C	Request Audio Output Plug Status	Output	0	B	
Audio Control					
0x10	Control Audio Output Mute	Output	Enable	A	2
0x11	Request Audio Output Mute Status	Output	Memory	B	
0x12	Control Audio Output Volume	Output	Level	A	2
0x13	Request Audio Output Volume	Output	Memory	B	
0x14	Control Audio Output Bass	Output	Level	A	2

0x15	Request Audio Output Bass	Output	Memory	B	
0x16	Control Audio Output Treble	Output	Level	A	2
0x17	Request Audio Output Treble	Output	Memory	B	
0x18	Control Audio Output Subwoofer	Output	Level	A	2
0x19	Request Audio Output Subwoofer	Output	Memory	B	
0x1C	Control Audio Output Delay Low	Output	Delay1	A	2
0x1D	Request Audio Output Delay Low	Output	Memory	B	
0x1E	Control Audio Output Delay High	Output	Delay2	A	2
0x1F	Request Audio Output Delay High	Output	Memory	B	
Video Control					
0x20	Select Input EDID Type	0	EDID	A	2
0x21	Request Input EDID Type	1	0	B	
Device Information					
0x30	Request Protocol Version	0	0	C	1
0x31	Request Firmware Version	0	0	C	
0x3F	Request Device Information	0	0	D	1
0x3F	Request Extend Information	1	0	E	

**Command Note:**

1. All devices support the command.
2. Support broadcast commands.
3. Memory #0 is the current status, it can't be stored. Memory #1 – 8 is allowed to be stored.
4. Use 0x3F to confirm the device connected is properly and supported commands.

## D-1.3 Index Byte

### Index Byte (IB)

<i>Name</i>	<i>Bit 7</i>	<i>Bit 6</i>	<i>Bit 5</i>	<i>Bit 4</i>	<i>Bit 3</i>	<i>Bit 2</i>	<i>Bit 1</i>	<i>Bit 0</i>
IB	Index							

**Index:** Please refer to "Table - Host Request List" and "Table - Command Index List".

**Table – Command Index List**

Index	Description
Output	The output that will be selected. (Port 1 = 1, Port 2 = 2... Port n = n) 0: All outputs
Input	The input that will be selected. (Port 1 = 1, Port 2 = 2... Port n = n) 0: All inputs
Setting	The setting type that will be selected. 0: All Settings 1: Switch Settings only 2: Video/Audio Settings only
-	Don't care

## D-1.4 Value Byte

### Value Byte (VB)

<i>Name</i>	<i>Bit 7</i>	<i>Bit 6</i>	<i>Bit 5</i>	<i>Bit 4</i>	<i>Bit 3</i>	<i>Bit 2</i>	<i>Bit 1</i>	<i>Bit 0</i>
<b>VB</b>	Value							

**Value:** Please refer to "Table - Host Request List" and "Table - Command Value List".

**Table – Command Value List**

<b>Value</b>	<b>Description</b>
Input	The input that will be connected. (Port 1 = 1, Port 2 = 2... Port n = n) 0: Disconnect
Memory	Select Memory Location 0 : Current Status (Can't be stored)
Enable	1: Enable Status (example: Mute, Plug) 0: Disable Status (example: Unmute, Unplug)
Level	Level Range (0 – 100) 0x81: Increase a step 0x82: Decrease a step
Delay	Audio delay time is 16-bit data. (Unit: 5 ms or 10 ms) Delay1 - The audio delay time low byte. (Bit0 – Bit7) Delay2 - The audio delay time high byte. (Bit8 – Bit15) The audio delay time unit decided by the DTUF flag of the extend information. The maximum Delay decided by the DTMAX flag of the extended information.
EDID	EDID Type 0: Fixed (Device default EDID) 1: Output 1 (Copy the EDID from the output 1)
-	Don't care

## D-1.5 CRC Byte

### CRC Byte (CB)

Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
CB	CRC (cyclic redundancy check)							

**CRC:** Host must send CRC code to follow the last byte.

**Table – CRC Table**

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	00	5E	BC	E2	61	3F	DD	83	C2	9C	7E	20	A3	FD	1F	41
10	9D	C3	21	7F	FC	A2	40	1E	5F	01	E3	BD	3E	60	82	DC
20	23	7D	9F	C1	42	1C	FE	A0	E1	BF	5D	03	80	DE	3C	62
30	BE	E0	02	5C	DF	81	63	3D	7C	22	C0	9E	1D	43	A1	FF
40	46	18	FA	A4	27	79	9B	C5	84	DA	38	66	E5	BB	59	07
50	DB	85	67	39	BA	E4	06	58	19	47	A5	FB	78	26	C4	9A
60	65	3B	D9	87	04	5A	B8	E6	A7	F9	1B	45	C6	98	7A	24
70	F8	A6	44	1A	99	C7	25	7B	3A	64	86	D8	5B	05	E7	B9
80	8C	D2	30	6E	ED	B3	51	0F	4E	10	F2	AC	2F	71	93	CD
90	11	4F	AD	F3	70	2E	CC	92	D3	8D	6F	31	B2	EC	0E	50
A0	AF	F1	13	4D	CE	90	72	2C	6D	33	D1	8F	0C	52	B0	EE
B0	32	6C	8E	D0	53	0D	EF	B1	F0	AE	4C	12	91	CF	2D	73
C0	CA	94	76	28	AB	F5	17	49	08	56	B4	EA	69	37	D5	8B
D0	57	09	EB	B5	36	68	8A	D4	95	CB	29	77	F4	AA	48	16
E0	E9	B7	55	0B	88	D6	34	6A	2B	75	97	C9	4A	14	F6	A8
F0	74	2A	C8	96	15	4B	A9	F7	B6	E8	0A	54	D7	89	6B	35

**Example:** switch output 6 to the input 3.

Byte 1 (DB) is 0x20 – Device: Identifier + Device ID = 0x20 + 0 = 0x20

Byte 2 (RB) is 0x01 – Request: Switch Video Output Channel = 0x01

Byte 3 (IB) is 0x06 – Index: Output 6 = 6

Byte 4 (VB) is 0x03 – Value: Input 3 = 3

Byte 5 (CB) is 0x93 – CRC code from Byte 1 to Byte 4. (CRC4)

### CRC Calculation

**CRC 0** = 0 (initial value)

**CRC 1** = CRC\_ TABLE [CRC 0 ^ **Byte 1**] = CRC\_ TABLE [0x00 ^ 0x20] = 0x23

**CRC 2** = CRC\_ TABLE [CRC 1 ^ **Byte 2**] = CRC\_ TABLE [0x23 ^ 0x01] = 0x9F

**CRC 3** = CRC\_ TABLE [CRC 2 ^ **Byte 3**] = CRC\_ TABLE [0x9F ^ 0x06] = 0x8D

**CRC 4** = CRC\_ TABLE [CRC 3 ^ **Byte 4**] = CRC\_ TABLE [0x8D ^ 0x03] = 0x93

## D-2 Device ACK Packet

When the device receives supported commands comes from the host, and then will response with following ACK:

**Table – ACK Type List**

Ack Type	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	...	Last Byte
<b>Type A</b>	AB							CB
<b>Type B</b>	AB	LB	Index 1	Value 1	Index 2	Value 2	...	CB
<b>Type C</b>	AB	LB	Data 1	Data 2				CB
<b>Type D</b>	AB	LB	INF	OP	IP	Name 1	...	CB
<b>Type E</b>	AB	LB	EXINF	VEINF	AEINF	PLUG	...	CB

### D-2.1 ACK Type A

**ACK Byte + CRC Byte (Total 2 Bytes)**

Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
AB	ACC	0	0	Device ID (0 – 31)				
CB	CRC							

**ACC:** The devices acknowledge status. Accept or Reject.

1: device accepts this request. (ACK; acknowledge)

0: device rejects this request. (NAK; negative acknowledge)

☞ The device sends the Nak packet is always 2 bytes. (NAK + CRC)

**0:** Reserve, Always 0.

**1:** Identifier, Always 1.

**Device ID:** Device id ranges from 0 to 31. (Please refer to device's user manual)

**CRC:** Device always sends the CRC code to follow the last byte.

## D-2.2 ACK Type B

**ACK Byte + LB + Index1 + Value1 + Index2 + Value2 +.....+ CRC Byte**

<i>Name</i>	<i>Bit 7</i>	<i>Bit 6</i>	<i>Bit 5</i>	<i>Bit 4</i>	<i>Bit 3</i>	<i>Bit 2</i>	<i>Bit 1</i>	<i>Bit 0</i>
<b>AB</b>	ACC	0	0	Device ID (0 – 31)				
<b>LB</b>	Length for the total data bytes (Index + Value)							
<b>IB n</b>	Index							
<b>VB n</b>	Value							
<b>...</b>	...							
<b>CB</b>	CRC							

**AB & CB:** These are the same as the ACK Type A.

**LB:** LB value is equal to the total data bytes (Index + Value), not include the CRC byte.

The maximum LB value of the ACK Type B is twice the total number of output or input.

**IB:** Often means that the input or output port number. (Port 1 = 1, Port 2 = 2... Port n = n)

**VB:** Response the status refers to the table.

Request	Description	Index	Value
0x07	Request Video Output Channel	Output	Input
0x08	Request Audio Output Channel		
0x09	Request Video Input Plug Status	Input	Enable 1: Plug 0: Unplug
0x0A	Request Audio Input Plug Status		
0x0B	Request Video Output Plug Status	Output	
0x0C	Request Audio Output Plug Status		
0x11	Request Audio Output Mute Status	Output	0: Unmute, 1: Mute
0x13	Request Audio Output Volume		Level Range (0 – 100)
0x15	Request Audio Output Bass		
0x17	Request Audio Output Treble		
0x19	Request Audio Output Subwoofer		
0x1D	Request Audio Output Delay Low		Delay1
0x1F	Request Audio Output Delay High		Delay2
0x21	Request Input EDID Type	Input	EDID Type

Please refer to “**Table – Command Index List**” and “**Table – Command Value List**”.

## D-2.3 ACK Type C

### ACK Byte + LB + Data 1 + Data 2 + CRC Byte (Total 5 Bytes)

<i>Name</i>	<i>Bit 7</i>	<i>Bit 6</i>	<i>Bit 5</i>	<i>Bit 4</i>	<i>Bit 3</i>	<i>Bit 2</i>	<i>Bit 1</i>	<i>Bit 0</i>
<b>AB</b>	ACC	0	0	Device ID (0 – 31)				
<b>LB</b>	Length for the total data bytes (This byte is always 2)							
<b>DB 1</b>	Data 1							
<b>DB 2</b>	Data 2							
<b>CB</b>	CRC							

**AB & CB:** These are the same as the ACK Type A.

**LB:** LB value is always 2 (Data 1 + Data 2). Not include the CRC byte.

**DB: Data Bytes as define below.**

Request	Description	Data 1		Data 2
0x30	Request Protocol Version	VER1		VER2
0x31	Request Firmware Version	VERA	VERB	VERC

#### Version Type A:

RS-232 Protocol Version contains the VER1 and VER2 (ex: VER1.VER2)

**VER1:** Data 1, Bit 7 - Bit 0 (Range 0 - 99)

**VER2:** Data 2, Bit 7 - Bit 0 (Range 0 - 99)

If the Data 1 is 0x01 and Data 2 is 0x07; VER1 = 1 and VER2 = 7; RS-232 protocol version is v1.07

If the Data 1 = 0x23 and Data 2 = 0x45; VER1 = 0x23 = 35 and VER2 = 0x45 = 69;

RS-232 protocol version is v35.69

#### Version Type B:

Firmware Version contains the VERA, VERB and VERC (ex: VERA.VERB.VERC)

**VERA:** Data 1, Bit 7 - Bit 4 (Range 0 - 9)

**VERB:** Data 1, Bit 3 - Bit 0 (Range 0 - 9)

**VERC:** Data 2, Bit 7 - Bit 0 (Range 0 - 99)

If the Data 1 is 0x10 and Data 2 is 0x07; VERA = 1, VERB = 0 and VERC = 7; Firmware version is v1.0.07

If the Data 1 = 0x23 and Data 2 = 0x45; VERA = 2, VERB = 3 and VERC = 69; Firmware version is v2.3.69



## D-2.4 ACK Type D

**ACK Byte + LB + INF + OP + IP + Name 1 + Name 2 + Name 3 +.....+ CRC Byte**

<i>Name</i>	<i>Bit 7</i>	<i>Bit 6</i>	<i>Bit 5</i>	<i>Bit 4</i>	<i>Bit 3</i>	<i>Bit 2</i>	<i>Bit 1</i>	<i>Bit 0</i>
<b>AB</b>	ACC	0	0	Device ID (0 - 31)				
<b>LB</b>	Length for the total data bytes (INFO +.....+ Name n)							
<b>INFO</b>	Audio	Video	Extend	0	Total Memory Location (0 - 15)			
<b>OP</b>	Total Output Port							
<b>IP</b>	Total Input Port							
<b>NB 1</b>	Device Name (ASCII code)							
<b>...</b>	...							
<b>NB n</b>	Device Name (ASCII code)							
<b>CB</b>	CRC							

**AB & CB:** These are the same as the ACK Type A.

**LB:** LB value is the total length of the data bytes, not include the AB, LB and CB.

The maximum LB value of the ACK Type D is 19.

**INFO:** Device information

Bit 7: 1 - Support Audio switch tools request. (Request 0x02, 0x04, 0x06 and 0x08)

0 - Not support Audio switch tools request.

Bit 6: 1 - Support Video switch tools request. (Request 0x01, 0x03, 0x05 and 0x07)

0 - Not support Video switch tools request.

Bit 5: 1 - Extended information exists. (Request 0x3F [0x01])

0 - Extended information does not exist.

Bit 4: Reserve, always 0.

Bit 3~0: Total Memory location ranges from 0 to 15.

☞ Request [Index], if 0x3F [0x01] ⇒ Request = 0x3F and Index = 0x01

**OP:** The total number of output.

**IP:** The total number of input.

**NB:** Device Name (ASCII code). (The maximum length is 16)



## D-2.5 ACK Type E

### ACK Byte + LB + EXTI + VIDI + AUDI + PLUG +.....+ CRC Byte

Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
AB	ACC	0	0	Device ID (0 - 31)				
LB	Length for the total data bytes (EXINF +.....+ DTMAX)							
EXINF	LBMAX		0	0	0	0	0	FWVER
VEINF	EDID	0	0	0	0	0	0	0
AEINF	DTUF	DELAY	0	0	SW	TRE	BASS	VOL
PLUG	0	0	0	0	AOPD	VOPD	AIPD	VIPD
DTMAX	Delay Time Maximum (unit: 100 ms)							
CB	CRC							

**AB & CB:** These are the same as the ACK Type A.

**LB:** LB value is the total length of the data bytes, not include the AB, LB and CB.

**EXINF:** Device extended information

LBMAX - defines the maximum LB value of the variable length command

0 - The maximum LB is 64 Bytes (default)

1 - The maximum LB is 128 Bytes

2 - The maximum LB is 254 Bytes (255 is reserved)

3 - Reserved

The LB value of the Ack packet is not limited by LBMAX.

If the extended information does not exist, the default maximum length is 128.

FWVER - Firmware version command flag. (Request 0x31)

1 - Support Firmware version command.

0 - Not support Firmware version command.

**VEINF:** Video Extend Information

EDID - Input EDID type select command flag. (Request 0x20 and 0x21)

1 - Support Input EDID type select command.

0 - Not support Input EDID type select command.

**AEINF:** Audio Extend Information

VOL - Volume and Mute command flag. (Request from 0x10 to 0x13)

1 - Support Volume and Mute command.

0 - Not support Volume command.

BASS - Bass command flag. (Request 0x14 and 0x15)

1 - Support Bass command.

0 - Not support Bass command.

TRE - Treble command flag. (Request 0x16 and 0x17)

1 - Support Treble command.

0 - Not support Treble command.

SW - Subwoofer command flag. (Request 0x18 and 0x19)

1 - Support Subwoofer command.

0 - Not support Subwoofer command.

DELAY – Audio delay command flag. (Request from 0x1C to 0x1F)

1 - Support audio delay command.

0 - Not support audio delay command.

DTUF - defines the audio delay time scale units.

1 - Audio delay time scale unit is 10ms

0 - Audio delay time scale unit is 5ms (default)

☞ If the AEINF is not equal to 0, the device support Request 0x04[0x02] and 0x06[0x02].

**PLUG:** Plug Detect Support Information.

VIPD - Video input plug detection command flag. (Request 0x09)

1 - Support Video input plug detection.

0 - Not support Video input plug detection.

AIPD - Audio input plug detection command flag. (Request 0x0A)

1 - Support Audio input plug detection.

0 - Not support Audio input plug detection.

VOPD - Video output plug detection command flag. (Request 0x0B)

1 - Support Video output plug detection.

0 - Not support Video output plug detection.

AOPD - Audio output plug detection command flag. (Request 0x0C)

1 - Support Audio output plug detection.

0 - Not support Audio output plug detection.

Others - Bit 7~4 are reserve, always 0

**DTMAX:** defines audio maximum delay time. (Unit: 100 ms)